

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Kloman's Friction Clutch for Reversing Rolling Mills.

In the spring of 1872, Mr. Andrew Kloman, of Pittsburgh, began the construction of a "Universal" mill designed for rolling narrow plates and heavy bars. It was thought that considerable economy could be effected in the working of the mill if some good device could be applied for reversing the motion of the rolls after each "pass" of the iron. This would avoid the necessity of a three-high mill, and would also dispense with all the usual cumbersome machinery employed in two-high mills for lifting the piece back over the top roll after the completion of each pass forward. The advantages to be gained by a two-high reversing mill were very great, considering the purpose for which this mill was intended. Mr. Kloman's plan included the construction of a long table on either side of the mill, provided with feed rollers, to be driven from the mill, and whose motion should correspond with that of the mill. The office of these feed rollers would be first to carry the piece, as it came from the heating furnace, into the rolls, the piece passing through the rolls and being received by the rollers on the other side of the mill, which carried it as it came from the rolls until the pass was completed. The motion of the entire mechanism would then be reversed, the top roll having previously been screwed down sufficiently to give the piece the required reduction in the next pass; the feed rollers would then carry the piece forward into the rolls, to be received again by the rollers on the side of the mill from which it first went into the rolls. This would be repeated until the piece was reduced to the required length and thickness. In describing his experiments Mr. Kloman says:

"I was very much confined in my plans for a reversing gear, being compelled to adopt for the driving power of the mill a large fly-wheel engine already fixed on the ground, which had previously been used for driving an ordinary roll train. I was therefore compelled to go beyond the engine (where the mill might easily have been reversed by the use of engines reversing with the ordinary link motion), and was driven to the adoption of something in the form of a reversing clutch and gear."

Much difficulty was here to be overcome, since the mill was intended to do very heavy work, and of all the forms of reversing clutch then in use, there was none capable of performing all that would here be required of it. Mr. Kloman was nevertheless satisfied that the principle was right, and that the difficulties to be met must be overcome by constructing a clutch in such a manner that it would be capable of answering all the demands which would be made upon it. The machine illustrated in the accompanying cuts was adopted as promising to meet all requirements, and the fact that it has been in successful operation for over four years, and that another machine, built from the same patterns, has been used with entire satisfaction for about two years by the Cleveland Rolling Mill Company, in connection with the blooming train of their steel rail mill, warrants the assumption that it is a complete success. We will describe it somewhat in detail for the benefit of our readers.

In order to have two wheels run loose upon the same shaft in opposite directions where right and not beveled-faced spur wheels are used, it is necessary to employ, in all, five wheels, as shown in the cuts.

Referring to Fig. 1 of the drawing, we naturally begin at the engine shaft, Z. To this shaft the spur wheel, A, is attached. This wheel is geared into the friction wheel, B, on the one side and into the spur wheel, C, on the other. The wheel, C, is fixed fast to its shaft, as is also the large spur wheel, D, which latter is geared into the second friction wheel, B'. The friction wheels, B and B', which both travel loosely upon their common shaft, S, are thus made capable of having imparted to them motions in opposite directions. Attached to the inner sides of these friction wheels, B and B', are the friction rings, E and E', whose inner surfaces are cut into grooves, as shown, into which corresponding projections on the friction segments, F and F', are made to fit.

The object of this arrangement is to obtain a larger bearing surface for friction

than could be had with plain faces bearing upon each other. The construction of the friction segments, F and F', is better shown in Fig. 3, which is an elevation of the friction ring and friction segment.

The chief feature of this arrangement is the ring, F (Fig. 3), which is divided into three segments, and is concentric with the inner surface of the friction ring, E E' (Fig. 1). These segments (Fig. 3) are each attached to the arms, m, m' and m'' respectively, by means of an arrangement shown at g, which consists of two slots in the arms in which the bolts attached to the segments are allowed to play slightly, thus admitting of the friction segments being brought to bear upon the friction ring and again withdrawn when required.

The arms, m, m' and m'', and the hub, h, are keyed fast to the shaft, s (Fig. 1), and both, of course, have the same motion as that of the shaft.

The friction segments are forced against the friction rings, and the friction grooves thus brought to bear by an arrangement shown in Fig. 3. This consists of an arm, k, carrying at its outer extremity a double screw, whose threads are cut in opposite directions on either side the arm. Both ends of this double screw are made to fit into

of the perpendicular, the motion being slow enough to allow the mill to come just to a state of rest before the friction segments in the other wheel are brought to bear upon the friction ring, and the mill will thus be reversed in motion with little or no jarring.

In the details of this important improvement we are indebted to a paper communicated by Mr. Kloman to *The Metallurgical Review*.

Progress of the Electric Light.

The following items, showing the progress which is now making in the utilization of the electric light, are taken from recent dates of English journals:

At the Society of Arts last evening a paper on electric lighting was read by Dr. Percy Higgs, who gave an interesting account of the forms of apparatus now chiefly employed, and an estimate of the comparative cost of electricity and of gas as sources of illumination. He assumed that gas could not be manufactured below an average price of 2/ per 1000 cubic feet, and that a gas burner, to give the light of 20 candles, must consume 6 cubic feet per hour. On these data the cost of 8000 candles' light for 1500 hours, allow-

shown, naked and elevated in the courtyard, one at each end, to counteract shadows, as it is used at the railway station of La Chapelle and in several machine shops, and in the lecture room within ground glass globes. The professor, having reviewed the whole subject with great clearness, introduced Mr. Jablockhoff, who lighted eight of his "electric candles" in one circuit.—*Journal of Society of Arts*.

A successful experiment with the electric light was made, on the 25th of March, in the central lobby between the two houses of Parliament. The object was to test the power and quality of the light, with a view of its being adopted in the House of Lords. The lighting of the Chamber of Peers is not at present satisfactory, and it is consequently engaging the attention of the First Commissioner of Works. There seems good reason for supposing, from the favorable manner in which Mr. Gerard Noel regarded last night's experiments, that the new light will be adopted when the apparatus used in its production has been completed. The magnets which produce the electric current are caused to rotate by steam, and the engines now employed for heating and ventilating the buildings will supply a sufficient motive power.—*Daily Telegraph*.

on the back shaft. The cone probably made 16 revolutions for one of the spindle, thereby increasing the power enormously. There was a face plate, as large in diameter as would swing, with four slots, and the rest square holes, very stiff; no spring to it. The following head stock was in proportion; a splendid tool. A first-class workman was put on it, and after running it some years left it in good working order without a scratch. Afterward some cheap, inexperienced man got hold of it and made a total wreck of it.

In my opinion, if more attention was paid to power and stiffness and good wearing long bearings in the construction of machinists' tools, and less to ornamental gingerbread flourishes and nonsensical sharp corners, they would give better satisfaction in the long run.

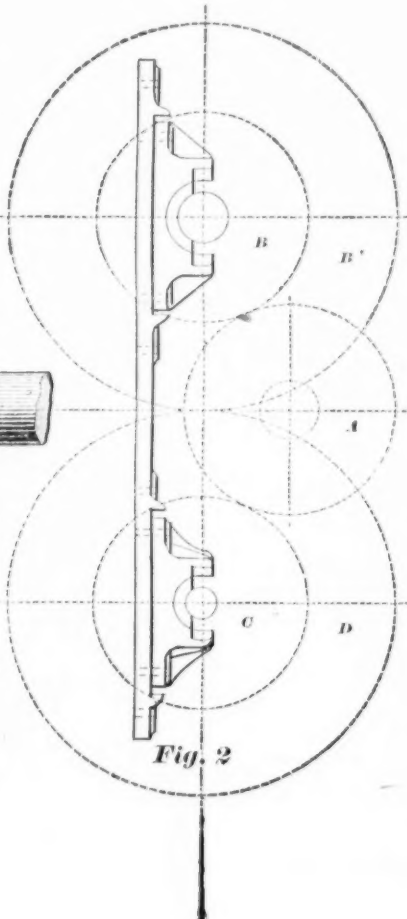
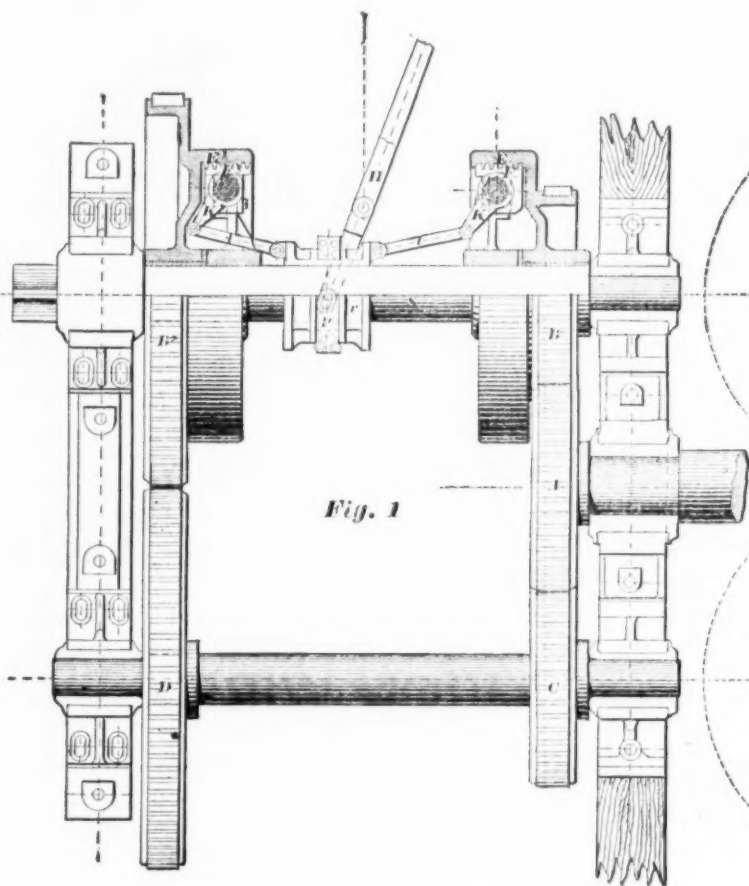
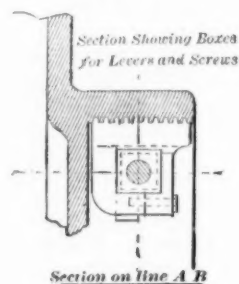
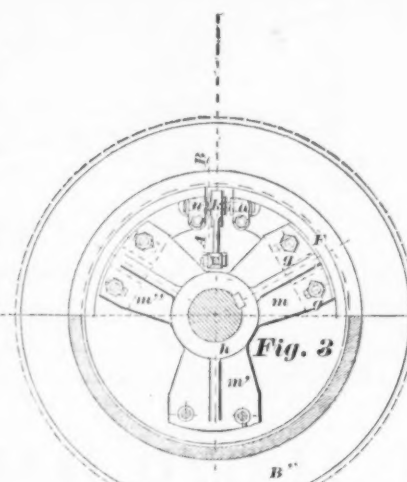
The Microphone.

A paper lately read before the Royal Society announces the invention by Prof. Hughes of this astonishing instrument or apparatus, which opens to our ears a universe of sounds hitherto inaudible—just as the microscope revealed a world of minute life and structure unknown before. Like

Mr. Edison, Prof. Hughes was one day employing the telephone for various acoustic experiments. He wished to investigate the effect of sonorous vibrations upon the electrical behavior of conductors, led to this idea by the way in which selenium is known to become electrically affected by light, and also by the researches of Sir William Thomson upon the electrical conduct of strained wires. The Professor had a stretched wire on his telephonic circuit, and, though he talked and plucked at it, no effect followed until it broke. At that moment the telephone uttered a sort of "shh," which was very curious. He placed the broken ends together under a weight, and obtained again faint sounds, which were improved when the wires were connected by iron nails, or a steel watch-chain—the more pieces and the more diverse in substance from the conductor seemingly the better. Experimenting still further with his broken circuit, especially in the direction of this whisper from science about "more pieces," he found metallic powder or fine metal filings wonderfully augment the power of transmitting sounds; while shot, in a bright condition, platinum, carbon and mercury also gave good results, particularly the last. Following up this clue, Prof. Hughes hit

upon a plan of suspending finely-divided mercury in a stick of charcoal by heating the latter and plunging it into quicksilver, whereupon the charcoal becomes infiltrated with the mercury in minutest but continuous particles. Inserting a "transmitter" of this sort in his circuit, an absolutely amazing sensitiveness to sound, as well as power of conveying it with the utmost fidelity, was displayed by the apparatus. A touch of the finger on the vibrating plate was conducted to the speaking end in volume of vibration like the rustle of a forest; the stroking of a camel's-hair brush on a card was magnified into the sound of a loud whisper; the beat of a pulse or the tick of a watch was found to pass with perfect clearness through a resistance representing 100 miles of space; and, when a fly happened to walk over the plate, the tramp of its feet was most distinctly caught, like that of some six-legged horse trotting, and it was, moreover, heard to trumpet from its raised proboscis like an elephant in an Indian jungle. Sounds, in fact, totally inaudible before to human ears were arrested and reported by this simple and accidental expedient of interrupting the electrical circuit with a finely divided conducting material. There is almost no doubt that this perfected microphone will convey to us that hidden ripple of the sap rising in growing trees and plants, which Humboldt said might be a continuous melody in the auditory organs of earth's smallest creatures.

The *Chicago Tribune* says: Although there is considerable complaint of dullness, a general survey of the situation justifies the statement that the volume of legitimate trading is larger than at this date in preceding years. This is especially the case with the dry goods, grocery and lumber trades.



KLOMAN'S IMPROVED FRICTION CLUTCH FOR REVERSING ROLLS.

threaded boxes inserted in the ends of the friction segments, as at a and o, each end of the double screw working into the end of the segment on the corresponding side of the arm, k. A similar arrangement is placed in each of the three ports or spaces between the ends of the segments. These arms, k k' (Fig. 1), are, by means of links, l l', connected with a movable sleeve, r, which travels back and forth on the shaft, s, by a slot and key arrangement.

This sleeve, r, is moved at will on the shaft by a forked lever, H, connected with a ring, P, which is fitted into a groove on the sleeve, r, allowing the sleeve to turn with the shaft, and yet at the same time to be moved back and forth with the lever, H. The mode of operating this machine will now be readily understood. If we suppose the engine to be running and the arms, k k', &c., to be drawn into a position such that they shall all point to the hubs of their respective friction wheels, as shown in Fig. 3, then the friction rings, E and E' (Fig. 1), will run in opposite directions and free from contact with the friction segments. In such position the shaft, s, and of course the mill, will be at a standstill. If, now, by some arrangement, but preferably a steam cylinder and connecting piston rod, the lever, H, is moved over to the position shown in the drawing, the arms, k, of the friction wheel to the left will be forced back within the wheel, thus turning the double screws which they carry, forcing the friction segments apart, and the resultant force being normal at every point of contact with the inner surface of the friction ring, the two parts will thus be brought to bear upon each other, and the shaft, s, will turn with the friction ring and segment which bear upon each other. To reverse the mill the lever H, is carried over to a corresponding position on the other side

ing £24 for interest on the outlay for plant, would be £380. 5/, but the same amount of light can be obtained from electricity at a cost of £180, the difference in favor of the latter being thus as 2.1 to 1. The calculation of the price of gas is made with reference to places where it is manufactured for many consumers, but if the gas were manufactured solely for the light required by the comparison, the cost would rise ten to twelve times that of the electric lighting. At the same time the two agencies are not at present in actual competition, inasmuch as the electric light is chiefly valuable for purposes which gas fulfills only imperfectly, as for lighting up large spaces, for allowing engineering and other works to be continued during the night, and for various uses in the time of war. Dr. Higgs gave a list of establishments in which the electric light is even now regularly employed, among them the chocolate factories of M. Menier, the works of the new Grand Hotel in Paris, the erection of the Tay Bridge and the works of Messrs. Head, Wrightson & Co., at Stockton-upon-Tees. In a concluding summary the author, while admitting that there is still much to be done before the electric light can be employed with comfort in illuminating rooms or halls of ordinary dimensions, said that it can now be economically used, both with regard to its intensity and color effect, where gas lighting or other modes of lighting are valueless. In lighting large workshops, stores, &c., electricity enters into competition with gas, both in economy and safety from fire.—*London Times*.

The question of the electric light is to be introduced to the world on a large scale at the Exhibition. Experiments which were very successful were made some time since in the Palais de l'Industrie, and the other day the subject was treated at the Sorbonne by M. Jamin, of the Institute, when the light was

Construction and Care of Tools.

A veteran mechanic writes for the *Railroad Gazette* some of his experience on the construction and care of the fine tools of the machine shop. He says: One class of lathes is made light, and although the workmanship may be first rate, and everything about them handy and easy to handle, and quick to change from one job to another, they are still so constructed that they are short-lived, soon wear on the ways where most used; a great deal of tremendous polish with knick-knacks, sharp corners and cabinet maker sofa-legged ogees. That sort of thing is an abomination in the eyes of Sir Joseph Whitworth, Sellers, Freeland and Moodna of Orange county. Their plan is to make everything as plain as possible, with round corners and perfect workmanship. Bodmer, an ingenious Swiss, some 30 or 40 years ago was in partnership with Birley, of Manchester, England. He was considered the most particular machinist in the world, and manufactured tools for his own use. His lathes were constructed something like Whitworth's, with conical steel journals in the lathe spindles, steel-hardened bushes ground on the same principle as Whitworth's templates, compound slide rests, &c. He would discharge a man for laying a hammer or a wrench on the bearers or shears. The consequence was that his tools, after being in constant use for 13 or 14 years, were in such excellent order that they sold for above their value when new.

My experience in some shops is the reverse of the above. Some 25 years since there was a splendid lathe came into a machine shop in Buffalo from Moodna, Orange county; 18-inch heads from the centers, with compound slide rest. The fast head stock was so constructed that the largest possible cone and wheel would swing, and a small pinion

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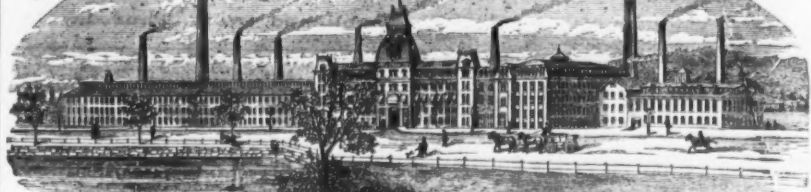
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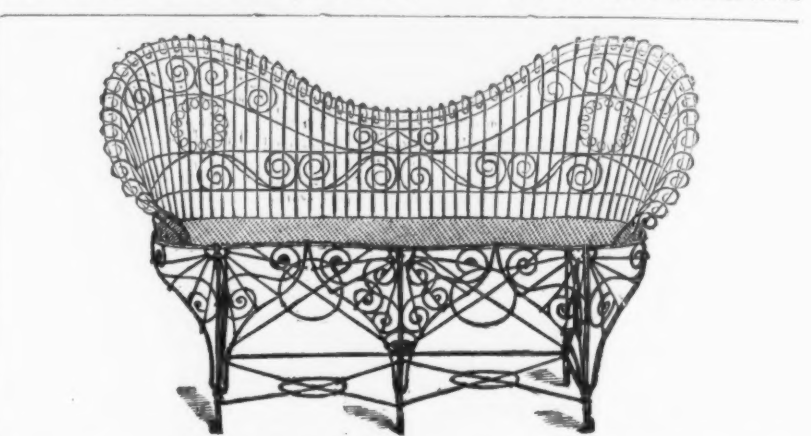
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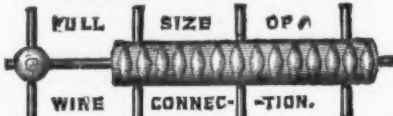
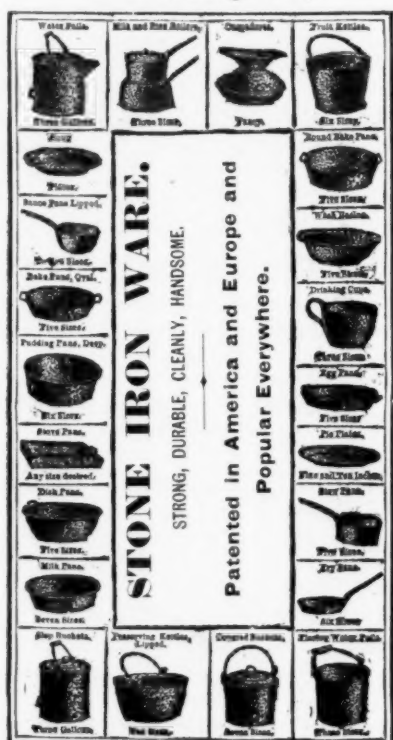
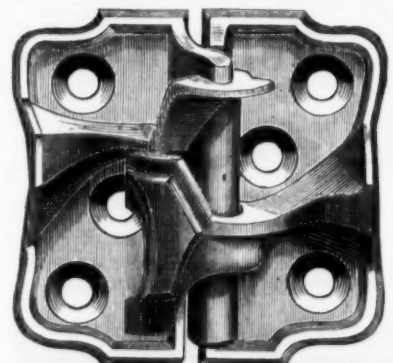
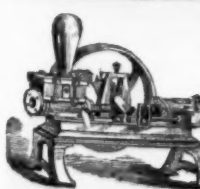
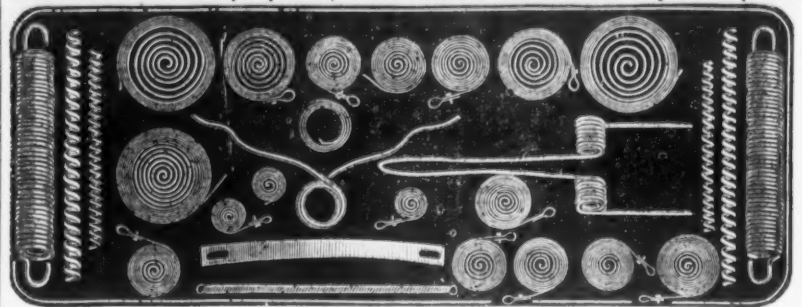
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Constructed without
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Patented.

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Our large production of this article enables us to reduce prices, as will be noted below. This Pipe is rapidly gaining in favor and must eventually supersede the old style entirely. Made wholly by machinery, every joint is exactly alike, and all fit together with perfect accuracy. A child can adjust it, no tools being required. It is indispensable in the household on this account. Fifty joints of 5 inch Pipe can be packed in a case 10 inches square by 24 inches long inside, thus occupying hardly more room than Tin Plate, and securing the lowest rates of freight. The following are net cash prices, no charge for cases: 5 in., per joint, 11c.; 6 in., per joint, 12c. Other sizes in proportion. Sole manufacturers for the United States

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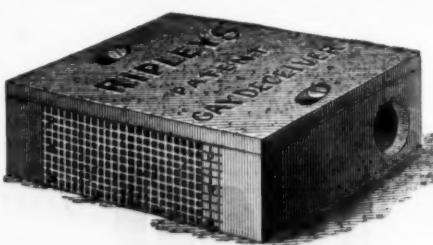
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For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.;
Cast and German Spring and Plow Steel."Iron Center" Cast Plow Steel. Finished Rolling Plow Counters with Patent Screw
"Soft Steel Center" Cast Plow Steel. Hubs attached.
"Solid Soft Center" Cast Plow Steel. Agricultural Steel cut to any pattern desired.
Steel Forgings made to order.Represented at 59 BECKMAN ST., NEW YORK, by
HOGAN & BURROWS Gen'l Agents for Eastern and New England States.Carriage, Tire, Machine, Plow, Stove and Spring Bolts, Coach and Bed Screws, &c.
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Per gross, cased, \$18.00; cases free.
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A handsome show card in each case of
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And all kinds of

Oyster & Steak Tin Wire Broilers, Meal & Flour Sieves.

PATENT DOMESTIC COFFEE POT,

Latest and best improvement in the market.

Grappling for a Cable.

Captain Thomas Stead, commanding the steamship Professor Morse, sailed last week from Brooklyn on a mission of which he lightly speaks as "going to pick up the Cuba cable." The easy, matter-of-fact way in which he seems to view his task hardly prepares one for a realization of what he is really about to undertake. "The cable is broken," he says, "32 miles from Key West, in the Gulf Stream, where the water is from 450 to 500 fathoms deep—say half a mile. We are going to pick it up, mend it, and lay it again. There are two cables between Havana and Key West, one of which stopped working a month or six weeks ago, and we have to find out why it did. It may have been cleanly divided or broken by chafing upon a rocky bottom, or from some other violence, and there may have been a minute perforation no bigger than a pin hole through the gutta percha covering reaching the copper wires, and so permitting the water to come in contact with them and destroy the insulation just as perfectly as if the cable had been chopped in two by an ax. The galvanometer simply tells us that the cable has been wounded so as to impair or destroy its usefulness, at a certain point, and we must discover what the injury is and how it is to be remedied. How do we clutch it at that depth? Easily enough. We have strong grapnels, four and five pronged, which we send down at the end of this powerful rope—which is made of wire and manila combined—and when, dragging on the bottom, they catch the cable, hoisting it on board is a simple matter. The hoisting rope passes over that drum, between those guides on the bow, over those two drums, and is coiled around this enormous drum, which is worked by a donkey engine. If our grapnels catch too near the end, where there is an actual break, the cable will slip off, of course, and then we must go further along the line and grapple for it again. The tension tells us when we have it, and when we get it on board we attach the galvanometer, and know at once how far from us, either way, the break is.

"When we splice the broken ends or attach a length of new cable, we cut one end wedge-shaped and fit the other to receive it, so as to bring in the closest actual contact the ends of the fine copper wires which we then solder firmly together. Then, over that, we put a wrapping of prepared gutta percha, which makes an absolutely impervious covering, taking great care that in doing so no pin holes or bubbles are left to make further trouble. Over that comes the protecting iron wire and its jute servings, the shield that protects the gutta percha. If a new cable has to be laid it is paid out over the stern. Down below are four huge circular tanks, capable of containing together about 300 miles of deep-sea cable. Our cable, you know, varies in size. The 'deep-sea' weighs about 2½ tons, the 'intermediate' about 4½ tons, and the 'shore ends' about 18 tons to the mile. The object in making the shore ends so much the heavier is to protect the cable as far as possible against injury from ships' anchors and rocks—whichever we use is coiled in those tanks in such a manner as to guard against the possibility of its kinking, and when being paid out is carried up through guides to traveler drums, on aft to a great drum, which it passes twice to give us the power to regulate the tension upon it, by means of brakes, and thence over small drums and through guides again into the sea. It is a work that must be done very carefully, with every precaution against straining, twisting, or looping the cable, and is necessarily slow.

"The principal job of cable laying performed by this vessel since I have been in command was the putting down of 110 miles between Key West and Punta Rasa. That was in comparatively shoal water, probably not more than 10 fathoms on an average. But before she belonged to the present company—the International Ocean Telegraph Company, owning the lines between this country and Havana and the West Indies—I believe she laid some shorter cables. We have done a great deal of repairing, however. Only recently we repaired this same cable, a little way off the Cuba shore, in a depth of 140 fathoms. Mr. Theophilus Smith was then the electrician in charge of the job. This time I take along as electrician Mr. George Keith, manager of the Cienfuegos cable. He has just been out in the same capacity on board the Investigator, on an expedition for the repair of the Cienfuegos cable, which was successfully grappled, hauled up and repaired from a depth of 1500 fathoms. We will take along about 40 men and engage 20 more at Key West."

The Professor Morse is an iron 1000-ton steamship, built at Glasgow especially for this service, at a cost of about \$150,000, and was allowed American registry by special act of Congress. She has four 30-inch cylinder engines, two screws working independently, which enable her to turn around in her own length, and her interior seems a mass of machinery ingeniously adapted to the uses for which she was designed.

The Standard for Coin Weights.—The Philadelphia Record says: The conscience-keeper of the nation's financial faith is deposited at the mint, Broad and Chestnut streets, in the form of a troy pound-weight, which is kept under duplicate locks and seals. There is a curious history connected with this weight. By it is determined the standard to which the accuracy of the gold and silver coins of the United States must attain. The commission appointed by the President to test the coins and make the annual assay, use this weight, and on these occasions it is taken from its carefully guarded seclusion, and it shows the accuracy and inaccuracy of the productions of the various mints in this country. This little cylinder is copied from a troy pound-weight preserved in the Tower of London, and on this latter the coinage of Great Britain rests for reliability. This exact witness of financial integrity is carefully preserved and guarded from tampering hands. At the conclusion of the assay and the commission's labors, the weight is entrusted to the care of the United States District Court, the Collector of the Port and the Director of the Mint, locked up and solemnly sealed for another year, only to appear twelve months

after and show which mint has been derelict in its work.

The Pig Iron and Steel Production of the World.

The following is abstracted from the first annual report issued to the members of the Bristol Iron Trade Association by Mr. J. S. Jeans, secretary:

In the manufacture of pig iron in Great Britain, 489 furnaces were more or less actively employed in 1877, the total number built being 974; while four years previously, of the 1070 furnaces built 671 were in operation. An interesting comparison is afforded by the following abstract, showing the expansion of the pig iron trade in Great Britain and the United States, in each of the following years:

Year.	Great Britain. Tons.	United States. Tons.
1740.....	17,359	53,900
1810.....	700,000	225,000
1823.....	1,248,871	286,603
1840.....	1,512,500	436,000
1854.....	3,069,338	735,248
1860.....	3,826,752	987,559
1870.....	5,903,515	1,850,000
1872.....	6,741,929	2,344,558
1874.....	5,991,408	2,589,413
1875.....	6,355,462	2,266,581
1876.....	6,555,997	2,093,236

The total pig iron production of the world is computed at 13,847,213 tons in the year 1876—when France produced 1,449,536 tons; Germany, 1,862,000 tons; Belgium, 440,958 tons; Russia, 397,500 tons; Sweden, 339,486 tons; Austria, 450,000 tons, and other countries, 223,000 tons.

The Bessemer Steel Trade in 1877.—Within a period of ten years the resources of the Bessemer works have increased two-fold. In 1868 there existed 18 works, with 57 converters of various capacity. In 1877, the number of works was 25, with 114 converters, ranging in capacity from 3 tons to 10 tons, one establishment at Sheffield, that of Sir John Brown & Co., having three of the largest capacity. The production of Bessemer steel ingots in 1877 amounted to 750,000 tons, being an increase of 50,000 tons over the previous year, while the production in 1870 was but 215,000 tons. From official sources, the following statement shows the world's yield of Bessemer steel in the year of 1876:

Countries.	No. of Makers.	No. of Conv'trs.	Tons.	Other Steel. Tons.
Great Britain.....	24	110	700,000	140,000
United States.....	11	27	325,996	71,178
Belgium.....	2	12	73,758
France.....	8	28	261,874	29,876
Sweden.....	12	38	21,789
Germany.....	19	78	242,261	128,449
Russia.....	2	4	8,500
Total.....	85	227	1,833,178

The Siemens Steel Trade in 1877.—This new and important process consists in reducing the pig iron and other materials to a molten state in a gas furnace, known as the Siemens regenerative gas furnace at an intense heat, and by the due admixture of pig iron, ore, and other materials, regulating the percentage of carbon, other impurities being removed by the process. The process differs from that of the Bessemer, in the fact of coal gas and air, in regulated proportions in combination at an enormously high temperature, passing over the surface of the molten metal; whereas in the Bessemer process, atmospheric air is driven through the liquid metal to remove the carbon therefrom. Soft steel manufactured by the Siemens open hearth process is employed in the manufacture of plates, axles, tires, molded castings, springs and other articles for which mild or soft steel is specially adapted. The cost of production by both systems varies but little. Recent experiments by the Siemens process show the cost at £6.13/8 per ton, exclusive of royalty. There are at the present time 15 works in Great Britain producing steel by the Siemens and Siemens-Martin processes, employing 90 open-hearth furnaces and about 500 crucibles, working in connection with the regenerative gas furnaces in active steel. The capacity of the open-hearth furnaces in active operation is equal to 250,000 tons per annum, that of the crucibles to 20,000 per annum. The annual yield of both varieties of steel by the Siemens process appears in the annexed summary for each of the years ending 1877, that of the United States being given side by side.

Year.	Great Britain. Open Hearth. Tons.	United States. Crucible Open Hearth Steel. Tons.
1873.....	77,500	5,900
1874.....	90,500	3,300
1875.....	88,000	4,000
1876.....	127,000	3,150
1877.....	137,000	4,900

Open hearth soft steel in the manufacture of ship and boiler plates is being largely employed. Recently it has received special recognition by the Admiralty and Lloyd's, and the successful efforts of Dr. Siemens to improve and cheapen the process of manufacture may be expected to aid it in developing a steady if not a rapid growth.

A French traveler among the Kurds states, as the result of his endeavors to ascertain the process employed by them in the manufacture of their sword blades, that the manufacturers in which these blades are made are situated at the declivity of a mountain, near cascades, the water of which, falling from rock to rock, arrives in the most limpid state in the reservoirs in which the blades are tempered, these reservoirs being also located where the air is very pure—these conditions of purity of air and water being considered essential to the success of the operation. Iron of the purest quality is used, and submitted to a very high temperature. The first tempering is commenced when the metal is at a white heat; it is exposed before fusion, the fuel being placed on each side, and the red-hot iron is then covered as quickly as possible with fatty and oily matters, such as paste made from bones, wax, &c. This process is thought to render the blade flexible. The second tempering is similar, except that the heated iron, after having thrown off considerable quantities of sparks, and having been exposed, is covered with a paste composed of powdered bones and purified mutton suet. The third tempering is effected by disposing the metal in such a manner that it may be seized by a man on horseback who rides at full speed, in order that the blade, which he bears in an elevated position, may receive the impression of the air.

Iron.
PHILADELPHIA.
**Siemens' Regenerative
GAS FURNACE.**
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Shafting & Pulleys, Steam Engines,
Pumps & Boilers, Copper, Brass,
Tin, Rabbit Metals, Foundry
Facings. Best Quality Ingot Brass.
Cash paid for all kinds of Metals and Tools.

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MINERS AND SHIPPERS OF
Magnetic Iron Ore.

The "BLUE" (Red Short) and "RED" (Neutral) Bessemer Ores, from Hacklebarney and Chester, New Jersey.
Price "Blue" Ore hand-broken and selected for April is \$2.50 cash, f. o. b. Hacklebarney Mines.
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have now an annual capacity of
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Or J. S. KENNEDY & CO., New York Selling Agency, 41 Cedar St., N. Y.

THE PHOENIX IRON CO.,
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curved to template, largely used in the construction of Iron Vessels.
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For Top and Bottom Chords of Bridges.
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REFINED BAR, SHAFTING, and every variety of SHAPE IRON made to Order.
Plans and Specifications furnished. Address,
SAMUEL J. REEVES, President.

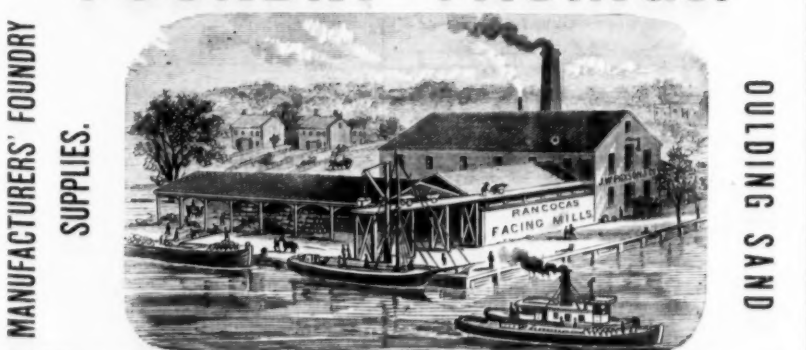
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LOCOMOTIVE AND CAR WHEEL TIRES,
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PLUMBAGO, MINERAL, CRUCIBLES, STOVE PLATE
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Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.
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Printed instructions for obtaining proper average samples for analysis furnished upon application.

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Manufacture
Extra quality small Rods, from best selected Scrap Iron.
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Nail and Wire Rods, Also,
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NEW YORK, 150 Pearl Street.
SAN FRANCISCO, CAL., 609 California and Front Sts.

Is the Ironclad War Ship a Failure?

The history of naval architecture, beginning with the days of Henry VIII of England, is chiefly marked by the development of that great embodiment of force, the ship of war. Beyond a doubt ship-building for naval, as distinct from mercantile purposes, has been governed by the advances made in the science of gunnery and the manufacture of heavy artillery, and is to-day more than ever under these influences. At a time when the bow and pike were the weapons of offense, the open-decked vessel was necessary for securing the greatest degree of mobility in the fighting crew and the delivery of the most effective discharges of arrows and other missiles. But when the forces of the combat were concentrated in artillery and muskets, cover and impenetrability became the great objects to be attained in building war ships, next to making them as seaworthy as possible. Hence the famous "wooden walls," which represented the might of England as the first naval power in the world after the decline of the Dutch navy. The power of penetration developed in the gun has, however, kept steadily ahead of the power of resistance possessed by the wooden walls, and although the latter were strengthened up to their utmost limit it was found that the gun still maintained its superiority. Without entering into the details of the progress of artillery, we may say that the invention of the long-range Lancaster gun and the necessity of fighting granite-clad forts at Sebastopol during the Crimean war compelled the adoption of armor plating as a defense, first on the floating batteries and finally on the regular war ships of European powers. Let us suggest also that steam as a motor has contributed largely toward sustaining the dominating influence of the gun over the naval architecture of modern times, because it was soon discovered that a single gun mounted by a vessel propelled by steam was worth in action an entire broadside of a cumbersome and slow moving sailing ship.

The limit of the power of guns is far from being reached, if we may judge by the advances made in their construction during the last five years. But we cannot fail to notice that in the contest for supremacy that commenced between artillery and armor-plating when the Gloire was built the latter is now far behind, and we might say hopelessly distanced. Indeed, we believe the time has arrived when a dispassionate investigation, which fortunately our naval officers are in a position to undertake, will lead to the conclusion that the ironclad ship of war, as represented by even the best types now owned by European nations, has attained its highest degree of perfection, and that it no longer possesses even the relative merit which it once had as an offensive-defensive engine of naval warfare. This has become such an important question for us that we may take advantage even of the deplorable accidents that from time to time befall the great ironclad ships of European nations, and learn useful lessons therefrom for our own guidance. Many considerations combine to justify our satisfaction that the United States is not at present burdened with enormously costly fleets of ironclads, which the experience of to-day render of doubtful value, and those of the immediate future may prove to be not only wholly valueless, but dangerous to our national interests. The invention of the torpedo in its present state of perfection, and the increase in the penetrative power and weight of projectiles, has revolutionized naval construction and tactics so much that we are warranted in waiting patiently until Europe completes her costly experiments before we begin to form a new navy. The worthlessness of ironclad fleets of the present type has been proved by the events of 1870 and of the late Russo-Turkish war, and we regard even the great fleet of England as incapable of forcing the Bosphorus against Russian guns and torpedoes. There is plainly to be seen, then, that even the powers most interested in maintaining the prestige of the ironclad are losing faith in it after all their enormous expenditures.

There are three elements necessary to constitute a superiority of naval force, and each ship of a fleet or squadron must possess them. They are the highest attainable powers of offense, of defense and of mobility. Without these special powers at command no absolute supremacy can be justly claimed. With them the supremacy will never be disputed. The highest power of offense embraces many conditions, but the chief ones are superiority in artillery and speed and the ability to reach the enemy in his place of refuge by means similar to those he employs to defend himself—namely, the auxiliary torpedo boat. A superior defensive power obviously means an ability to resist with success the greatest efforts of the enemy to inflict damage, and to choose the time and opportunity for action. The superior power of moving at will consists in being able to change position with rapidity and advantage, to attack when desirable, to retreat when necessary, to pursue with success and to escape with certainty. If ships of war possessed all these capabilities they would be irresistible and invulnerable. But it happens that in the case of the ironclad the possession of one or more renders the attainment of the others extremely difficult, if not entirely impossible. To cope with her enemy afloat and ashore the ironclad must carry the heaviest guns, with a proportionate weight of protective armor; she must be built of such a size and model as to sustain this extraordinary weight, maintain her equilibrium under all circumstances, and practically serve at all times as a gun platform afloat. Her draft must be increased to give her stability, but this involves an increase of her displacement and of the tax on her propelling power. To secure the requisite degree of speed in order that she can pursue or escape from any enemy, her boiler and fuel spaces must be enlarged and her vulnerability increased. An immense coal consumption, without which she is helpless, compels her to abandon her station at short intervals and replenish her bunkers at the nearest depot, her enemy in the meantime escaping unharmed.

Here, then, we have a ship with the highest offensive power minus the ability to keep the sea, and, let us assume, the highest defensive power also; but the important power of mobility is reduced to the lowest degree. If we give her the requisite speed and coal space it must be at the expense of guns and armor, and perhaps of stability, by reason of her increased length. Again, we must not forget that the turning power of a ship of war is of the utmost importance to her in action. If we lengthen the ship for speed we reduce this turning power, and in case she is attacked by rams, or is in the course of an action to be used as one, her usefulness is impaired and her own safety threatened. Loaded down with guns, armor, engines, boilers, coal and stores, the ironclad, though very formidable in appearance, is often worthless for war purposes, and dangerous only to herself or her consort. The enormous aggregate weight propelled by the powerful engines acquires a momentum that refuses to be controlled by the helm; hence the loss of the Vanguard and the terrible disaster to the German ironclad Grosser Kurfurst which occurred off Dover on the 31st ult. Referring to that deplorable calamity, we would point out that if the accident demonstrates the destructive power possessed by these ironclad vessels it also shows how liable they are to instant destruction, even when going through practice maneuvers in a calm sea. Recognizing this, we must consider how exposed they are in time of war to the deadly attacks of the torpedo boats and how helpless they become in every respect against such attacks. A torpedo costing a few hundred dollars is launched against an ironclad ship worth a million and destroys her as effectually as if she had been in action with a number of enemies of her own class.

Modern builders of ironclads—for we must regard those of the Gloire and the Warrior as among the ancient—take pride in the arrangement of water-tight bulkheads and the construction of cellular bottoms and so forth, precautionary arrangements intended to limit the sphere of damage to the smallest compass. But even these mark, as we before stated, the growing suspicions that the ironclad of the period is a failure, and must be replaced by a ship whose loss in action will not count relatively for more than that of a field gun in a land battle. There is not an ironclad afloat in European waters that would successfully engage a small battery armed with 100-ton guns such as that tested at Spezzia. An English ironclad fleet could not cruise off our coasts unless the coal depots of the Bermudas and Halifax were so near at hand. We do not believe that all the ships in the British fleet could force the Bosphorus against a Russian torpedo defense supported by land batteries. It is easily seen, therefore, that the ironclad is more formidable in name than in fact, unless, indeed, as has been unhappily demonstrated, that the ship she destroys is her consort.

Engineers' Club of Philadelphia.

At a recent meeting of the club Mr. Wm. F. Sellers read an interesting paper on the Kentucky River Bridge. The paper was illustrated by large photographs of the structure and by working drawings. The Cincinnati Southern Railway crosses the Kentucky River at a point where several years ago four stone towers were erected by Mr. Roebling. The structure for which these were intended was never completed. The river at this point is about 300 feet wide, and flows in the bottom of a narrow cañon about 300 feet deep and 1300 feet wide. For numerous reasons a pier in the river was rendered impracticable; so it was decided to use three spans of 375 feet each. These were erected without the use of any false works, which the great height of the bridge and the swift current of the stream precluded. Though a continuous girder in three spans would have fulfilled all of the conditions necessary during erection, yet the fact that the iron piers would vary in height with the temperature while the cliff abutments would not, made it obligatory that the spans should be so hinged as to permit of this vertical motion of the piers without altering the strains in the truss. It was finally decided to construct the bridge with a central span, which may be described as a beam supported near each end, the overhanging portions helping to support the central portion, the piers acting as fulcrums. The end spans were supported at the shore ends by abutments, and at the other end by the weight of the middle spans, acting over the piers as levers; the distance from the pier to the contraflexure point being the short arm of the lever. This important point was found by dealing with the truss panel by panel and member by member. The truss is 37 1/2 feet deep, 15 feet wide, and each span is divided into 20 panels of 18 3/4 feet each. All connections between the ties, posts and cords were made by pins. Those pins which were strained in erection were forced in place by hydraulic pressure and served as rivets, while other pins were put in loosely. The dimensions of piers and masonry, and the results of the final tests were given, all proving of very great interest.

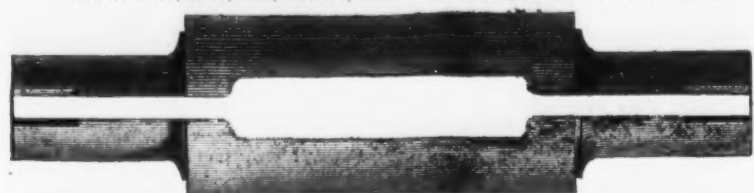
Dr. Wm. D. Marks called the attention of the club to some new and interesting drawing instruments. One of the instruments was of Prof. Marks' own design, being an adaptation of the Marquis rule, which enables a draughtsman to shade a cylinder, shaft, &c., with mathematical correctness.

A remarkable accident happened on the Kansas Pacific Railway on the morning of the 22d ult., by which a whole freight train was plunged into a river, and the engine and several cars were buried completely out of sight in the water and quicksand. The great flood of the day previous had swept away the bridge over the Kiowa River, and in the early morning, before light, the train approached and plunged into the gulf at full speed, carrying with it the engineer and firemen, and a man who was riding on the engine. The train fell 30 feet, and the cars which were not submerged were piled in utter wreck upon the submerged engine. It required several hours to reach the bodies of the drowned men.

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BELLAIRE NAIL WORKS,
A. L. WETHERILL, Manager.
I think your Rolls are just what you claim for them. The iron in them is fine and good, and the chill is even all over alike. They are the best for nail plate I ever worked. I can run a set of them three months without dressing, and make as good surface and good edges as you see on hoops, and they are ready to work fine iron at any time without change.

JAS. PATTERSON, NAIL PLATE ROLLER.
I have tried the Hollow Chilled Rolls for sheet steel for twelve months, and believe them to be in every way superior to solid rolls. They keep their surface and produce handsome work. They do not heat in the necks. Your Solid Rolls on small mill for steel wire, &c., also give us great satisfaction, combining surface and strength.

DAVID SHAW,
Manager for ANDERSON & PASSAVANT.
We have been using the Hollow Chilled Rolls for a year, and are more pleased with them than the solid rolls. We have no hot necks or "springing" rolls, with less number of dressings, and are now free from cobweb checks or cracks on face we were so much troubled with in our solid rolls.

SMITH, SUTTON & CO.
CHESBROUGH STEEL WORKS, Pittsburgh, April 11, 1878.
We have used several pairs of your Hollow Chilled Rolls. One pair ran until we dressed all of the chill off; the others are still in use and doing well.

MILLER, METCALF & PARKIN.
In reply to your favor of 28th, we have to say that the Hollow Rolls made by you, and on which we are now making sheet iron, are giving good satisfaction. The work we are doing on these rolls is of the very hardest kind, and tests rolls more severely than almost any other kind of work, making sheets Nos. 18 and 20, 2 to 3 feet long at one heat, from 4 by 4 in. wide. They are good hard surface, and even chill, and are still perfect after 6 months' use. We think these rolls are superior to any we have now in use.

J. WOOD & BROS.,
Manufacturers Imitation Russia Sheet Iron, &c.
CATARAUGUS, Pa., April 11, 1878.
The Hollow Chilled Plate Rolls received from you last summer have given us entire satisfaction, and if we were in need of Plate Rolls to-day we would order another pair just like the last. When we need pair you will hear from us. CATARAUGUS MFG. CO., OLIVER WILLIAMS, General Manager.

PENNSYLVANIA IRON WORKS,
PITTSBURGH, April 11, 1878.
It affords us pleasure to testify to the merits of your Hollow Chilled Rolls, after constant use of them in our mills at Pittsburgh and Scottsdale. The first one was put in one year ago, and we have taken particular notice of their behavior since that time. We say, as we have often said before, that we prefer them to any other rolls for their superior surface and general durability. We think they retain their "shape" better than solid rolls and keep cooler in the necks. We are at present using all Hollow Rolls, and when in need of more will, of course, order hollow ones.

EVEISON, MACHUM & CO.
RUBIA SHEET MILL, Niles, O., April 13, 1878.
We have used your Hollow Chilled Rolls in both our sheet mills for the past 12 months, and can confidently recommend them as strong, serviceable rolls.

GEO. SUMMERS, Supt.
PITTSBURGH, April 17, 1878.
We have been using your Hollow Chilled Rolls for several months, and so far they have given great satisfaction, and we see no reason why they should not continue to do so. We have kept a very careful watch so as to detect any defects in surface or other conditions, but have found nothing but what we can cheerfully commend.

JOHN I. WILLIAMS,
(For Grant, Bennett & Co.)
PITTSBURGH, April 17th, 1878.
We have been using your Hollow Chilled Rolls for nearly twelve months in our Universal Mill. We find that they do not expand out of shape in the body like solid rolls, and that we are consequently able to roll plates of more uniform thickness and with straighter and better edges. We consider them superior to solid rolls.

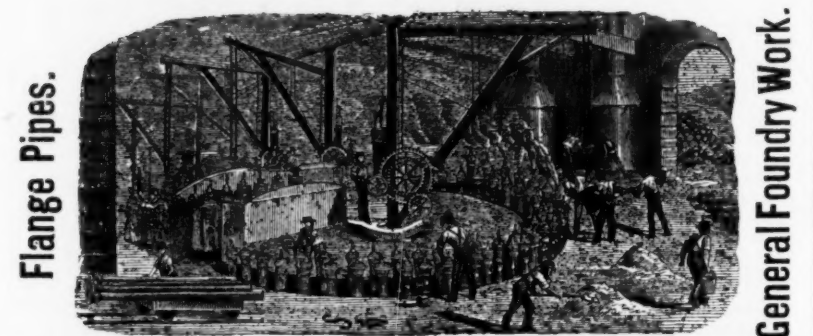
JOHN G. MATTHEWS,
Manager at WILSON, WALKER & CO.
NEWPORT, KY., April 10, 1878.
After a thorough trial of your Hollow Chilled Rolls on plates, sheets and wide iron bed, we have no hesitation in saying that they are the best Rolls we ever saw. They keep their surface, produce better finished iron, and do not get out of shape like solid rolls. They have been thoroughly tested as to strength and are satisfactory in every respect.

JOHN JORDON,
Manager SWIFT IRON AND STEEL WORKS.
PHILADELPHIA, April 10.
The pair of Hollow Chilled Rolls purchased from you we have been running for some time, and they give entire satisfaction.

HENRY DISTON & SONS.
PITTSBURGH, April 4, 1878.
The Rolls are now in the turning shop, undergoing the second dressing, and we can, without hesitation, state that having used a great number of chilled rolls for sheet steel rolling, we have never employed at our works a pair of rolls better in every respect than the pair referred to. Our sheet steel rolling is probably a much more severe test than your rolls will be subject to at any other works.

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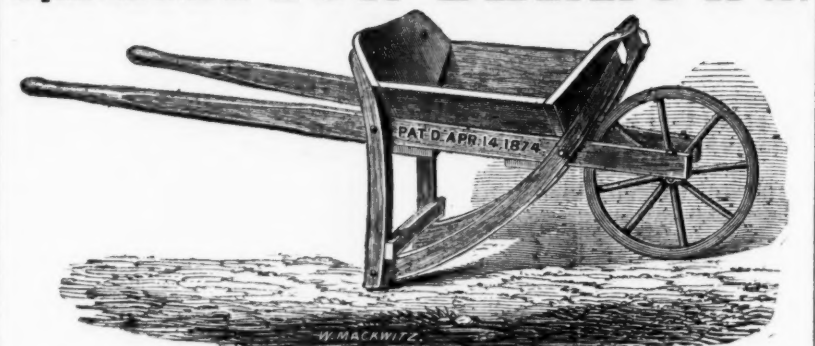
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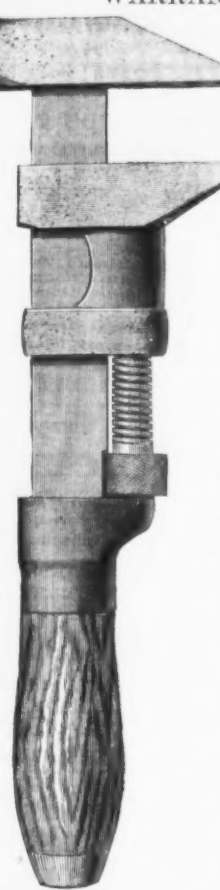
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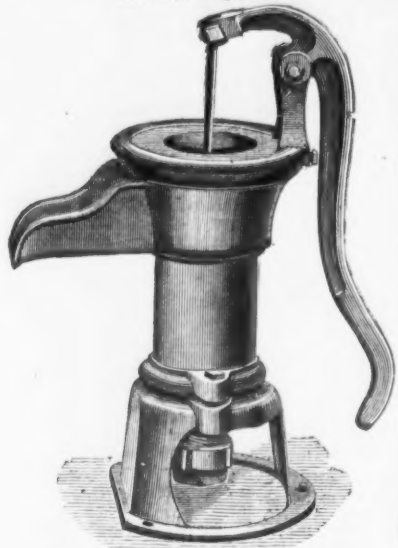
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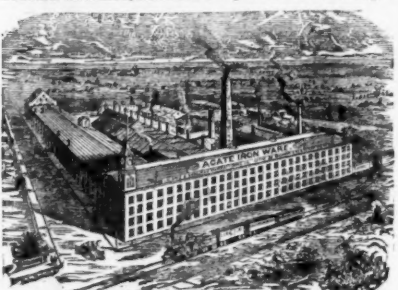


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broad, solid bearings in the knuckle,
which do not wear down readily and
let the door sag. It is Fast Joint,
therefore can be used for either right
or left hand. By actual test it has an
average of 50 per cent. more power
than other Spring Hinges in common
use of same size.
FINE Castings a Specialty.
NEW BRITAIN, CONN.
Warehouses,
98 Chambers St., N. Y.
67 Kilby St., Boston, (Pumps.)
Henton & Denckla, 507 Com-
merce St., Phila. (Butts.)
Send for Illustrated Catalogue
Price List.

**THE IMPROVED
HOWE
SCALES**

In Competition with the World at Philadelphia, 1876.
TWO FIRST MEDALS, and TWO DIPLOMAS OF MERIT

The following are the points that the Judges officially announce as the basis of their award of the
highest honors to the Howe Scales:
1st. For their Protected Bearings (the Howe is the only Scale with Protected Bearings), which makes
the Scale **DURABLY ACCURATE.**
2d. For their Strength.
3d. For their Simplicity.
4th. For their Economy in Construction.
5th. For their first-rate Material and Workmanship.
6th. For their various original Improvements and Adaptations (which being patented are exclusively
possessed by the **HOWE**).

The Improved Howe Scales
MADE BY THE
BRANDON MFG. COMPANY, of Brandon, Vt.,
Are Guaranteed Superior to all others.

For Plans, Prices and other information, address,
A. M. GILBERT & CO., 95 to 101 Lake St., Chicago; 116 Main St., Cin-
cinnati; 157 Water St., Cleveland, O.; 612 N. Third St., St. Louis.
PRIEST, PAGE & CO., 325 Broadway, New York.
213 Market St., Philadelphia.
145 Franklin St., Boston.
63 Wood St., Pittsburgh.
PARKHURST & CO., San Francisco, Cal.
FROTHINGHAM & WORKMAN, Montreal, Canada.

YALE LOCK MFG. CO.

OFFICE & WORKS:
Stamford, Conn., U. S. A.
SALESROOM:
53 Chambers Street, New York.

The Lalance & Grosjean Manufacturing Company.

The manufacture of stamped ware from
tin plate and black iron is an industry in
which American mechanical skill and inge-
nuity have attained results vastly more per-
fect than have been reached in any part of
the Old World. The success of our efforts
in this direction are largely attributable to
the fact that high wages and a compar-
ative scarcity of skilled labor have compelled
our manufacturers of sheet metal goods to
employ machinery in every branch of the
business, while the restless desire for im-
provement which has characterized our en-
terprising manufacturers has given us
presses which for power, precision and per-
fection of operation, are better than any
made abroad. These results have been
reached within comparatively few years,
and under the moderate protection afforded
by the tariff our manufacturers have not
only supplied the home market with better
and cheaper goods than could be obtained
abroad, but are manufacturing quite largely
for export.

For the beginnings and, to a great extent,
the development of this industry, the country
is indebted to the energy and perseverance
of Mr. F. Grosjean, president of the Lalance
& Grosjean Manufacturing Company. The
enormous and well appointed establishment
of this company, with a capacity for manu-
facturing 6000 tons of sheet metal per year
into useful forms, with little or no hand
labor, has legitimately earned and long en-
joyed a reputation for producing stamped
ware of superior excellence and finish. Dur-
ing the Centennial M. Dietz, of the firm of
Japy Freres, the well-known manufacturers
of stamped ware in France, visited the works
of the Lalance & Grosjean Manufacturing
Company, at Woodhaven, Long Island, and
admitted freely that some at least of the
regular products of that establishment could
not be made in any works in Europe. He
was not only surprised at what he saw, but
stated without reserve that many of the
processes worked without difficulty in this
country were regarded as mechanical impos-
sibilities abroad. Certainly nothing of
foreign manufacture shown at the Centennial
compared with domestic products in this
line, and we shall be surprised if the supe-
riority of our stamped tinware is not ac-
knowledgeed this year at Paris.

Like most of the establishments which
have grown up with the progress of the past
quarter of a century, the Lalance & Grosjean
Manufacturing Company began in a small
way. Mr. Grosjean sold in New York the
goods forwarded from France by Mr.
Lalance, and was the first to realize that it
was possible to make such goods here as well
as in Europe, and with a larger profit than
could be realized from their importation.
The business of manufacturing was begun in
1862 in a cellar on the corner of Hester
and Elizabeth streets, New York. Six men
were employed, and the results were so far
satisfactory as to demand a steady increase
in the capacity of the establishment. At
first the business of the New York establish-
ment was confined to the finishing and re-
tinning of stamped goods imported from
France, but one branch after another was
added until a complete line of American
stamped ware had been placed upon the
market. In 1863 it was necessary to find
more commodious quarters, and the business
was removed to Woodhaven, Long Island,
where a large factory was built. This was
completely destroyed on the 21st of Febru-
ary, 1876, by a fire which began in the igni-
tion of the grease in the tinning vats. All
the machinery, dies and stock were de-
stroyed, entailing great loss and incon-
venience. Fortunately, however, a duplicate
set of patterns and dies had been deposited
in a fire-proof building. These were saved,
and within three months the works were re-
built and again put in operation, with brick
walls, fire-proof roofs and entire security
against a second conflagration. The works
now cover an area of four acres and employ
450 hands. They contain eight presses and
probably 200 other machines, driven by a
Corliss engine of 150 horse-power. The
work produced is of superior excellence,
and every operation is conducted under the
personal supervision of Mr. Grosjean, whose
whole time is spent at the works superintend-
ing the mechanical processes.

The specialty of this company is the im-
portant line of goods known as agate ware.
This ware is stamped from black iron and
finished with a beautiful grayish mottled
enamel, the tint varying with the composi-
tion from deep bluish gray to grayish pink.
This enamel is applied in a semi-fluid condi-
tion, and perfectly vitrified by baking at a
white heat. The enamel is quite elastic and
adheres perfectly to the iron. Sharp blows
with a hammer will chip it off in spots, but
it does not star nor crack, and the removal
of a flake at any point does not cause any
other part of the enamel to peel off. The
company have been making enameled ware
in various colors, including white and blue,
for 15 years, and have built up in this line
an important business at home and abroad,
greatly preferred abroad to foreign enamels.
Among other specialties made by this firm
are the "Favorite" bake and dripping pans,
seamless and stamped without crimping;
also stamped brass kettles of all sizes, which
are given a superior finish by means of spe-
cial machinery. Their deepest and heaviest
stampings are made from one-eighth inch
iron plates, pressed into thimble-shaped ves-
sels of the extraordinary depth of 24 inches
and a diameter of 16 inches, with nearly
vertical sides, which are used as containing
vessels for the carbonic acid employed in
soda fountains. Most of the deep stamping
at this establishment is done in black iron
and subsequently tinned. The reason for
this is that tin plate cannot be annealed, and
in repeated stampings becomes brittle,
whereas black iron can be revived by
annealing, and when tinned is as tough and
ductile as before manufacture.

There is one event in the history of the
company which we think calls for something
more than brief mention. When the manu-
facture of the marbled ware, which be-
came so widely and favorably known, had
attained the proportions of an enormous
business, and the ware itself was enjoy-
ing a wide popularity, a question was
raised as to the safety of the ingredients

entering into the composition of the enamel.
A rumor that it contained lead in soluble
form quickly took the shape of specific
charges that it was poisonous. Knowing
that the only lead used was that which en-
tered the enamel as flint glass, that by bak-
ing at high temperature the enamel was per-
fectly vitrified, and that experience gave them
no warrant for the supposition that it was
soluble, the officers of the company paid no
attention to these damaging reports at first,
regarding them as false statements prompted
by malice. Finally the statement was made
on the authority of a Boston chemist that
the enamel contained lead in soluble form
and was not perfectly safe as a lining for
culinary utensils. The company then sub-
mitted the matter to competent chemists for
thorough investigation, deciding to abide by
their report at any cost. The result of re-
peated analyses showed that the lead in the
enamel which entered it as litharge used in
the manufacture of flint glass, was soluble
in certain acids and under certain condi-
tions. There was, therefore, a possibility
that it might do harm, though but little
probability, as the enamel was appar-
ently insoluble under any condition in
water or in the weak vegetable acids
developed in culinary operations. The
officers of the company did not believe, nor
do they now, that the enamel was any more
liable to part with poisonous metallic salts
than a glass tumbler, but analysis had shown
that a bare possibility existed, and they gave
the public the benefit of the doubt. The
manufacture of the marbled ware was at
once stopped; urgent orders were left un-
filled, and the trade was notified not only
that no more would be offered for sale, but
that all which had been sold would be re-
deemed. A business which it had taken
years to build up was thus deliberately
stopped and the company assumed an obli-
gation, which we are sorry to say has been
shamefully taken advantage of to return
tons of marbled ware worn out in service,
and replace it with new agate ware. The
course of the company in this matter is a
conspicuous example of commercial honor.
The marbled ware was sold in good faith
as free from any objection; the moment the
company had reason to doubt that their
guaranty was warranted by the facts, be-
fore the public had learned that the purity
of the enamel was questioned and while the
trade were ready to take all they could
make, they deliberately elected to stand the
heavy losses which their decision entailed,
and did so without complaint. Not until
they had positive assurance that they had
in the enamel of their present agate ware a
composition which would stand not only the
usage of the household but the most subtle
and searching tests of the laboratory, was
another piece made or sold.

American Machinery at Paris.—Ed-
ward King, writing to the Boston Journal,
says: Our display of machinery is well
chosen, but when we remember that the
galleries devoted to machinery on each side
of these colossal buildings on the Champ de
Mars are considerably longer than Machin-
ery Hall and the Main Building at Philadel-
phia put together, and that we occupy only
an insignificant space—small by comparison
with countries like Austria or Russia, coun-
tries which cannot supply one-tenth of the
inventive ability possessed by the United
States, it is a keen cause for regret. Our
delay, our wretched, inexcusable delay, was
the reason for this little and meager exhibit
of our chief talent. We were compelled by
a government who did not comprehend the
importance of the exhibition to postpone
everything until the very last minute, and
the result will certainly be humiliating. The
department of Italy—not far from ours—is
to be regal in its splendor, and extends over
two or three times as much space as ours.
It certainly was a mistake to allow ourselves
to be distanced by any country. We should
have been greedy and taken every particle
of space that we could get by applying at
an early day.

Coal in Peru.—A bed of coal of un-
known extent has been discovered at Chala
Atla, near Oluzco, in the department of
Libertad, Peru. The government sent a
scientific commission to examine the deposit
and has received a highly favorable report.
The Chala Atla coal field will, it is estimated,
suffice to supply the requirements of the
whole of South America, and the quality
and cheapness of the coal will enable it to
drive the English coal from these markets.
The average consumption of coal on the
coast of Peru is estimated at 200,000,000
tons per annum, which, at the rate of 22
soles per ton, gives a total of 4,400,000 soles
at present paid to England for fuel, and
which Peru hopes to save by utilizing her
newly-discovered sources of coal supply.

The Railway Age says: One of the most
remarkable examples of engineering enter-
prise and boldness is found in the narrow-
gauge extension, just completed, of the Col-
orado Central Road from Black Hawk to
Central. The distance between these two
places is one mile, but to accomplish it the
road has to climb an elevation of 563 feet
by a route 4½ miles in length. The
undertaking was pronounced impracticable
by many experienced engineers, but
has been successfully accomplished by
means of zigzagging switches, heavy rock
cuts, some of them 50 feet deep, four
bridges, numerous deep fills, one of 100
feet, and heavy machinery. The work, which
is of the most substantial character, is said
to have cost \$15,000 per mile, or about \$60,-
000. A standard gauge road over this
route would have cost vastly more if it could
have been built at all, which is doubtful—a
very good illustration of some of the advan-
tages of the narrow-gauge system for special
localities.

Three hundred colored laborers leave the
city of Washington this week for Brazil,
to work for the Messrs. Collins on the rail-
road they are building, under the guarantee
of the Brazilian and Bolivian governments.
As the death-rate of the negro population of
Washington is very large, these laborers
may not find a change to the malarial regions
near the equator of any particular disad-
vantage.



USE THE BEST.

NEW



THE NEW AMERICAN FILE COMPANY have the exclusive right to use the Bernot process for cutting Files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing Files and Steel.

NEW AMERICAN FILE CO., Pawtucket, R. I.

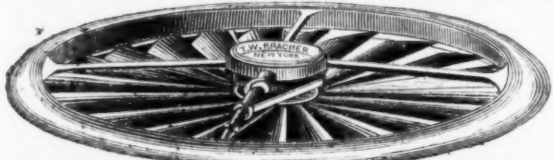
AUBURN FILE WORKS,
Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
FULLER BROS., Sole Agents,
89 Chambers and 71 Reade Streets, N. Y.

Granted for After more than Fifteen Years of Competition Superior Goods.
McGaffrey's Philadelphia Hand Cut Files and Rasps
Have Proved their Great Superiority.



Silver Medal. Highest Premium.
Messrs. ARNOLD & CO.,
310 California St., San Francisco,
Sole Agents for Pacific Coast.

Steam and Frost prevented on Show Windows.



REVOLVING VENTILATORS

For everything (and every size), from a hat or cap to an exhibition building. Kitchens, Laundries, &c., ventilated without draft. Durable, strong, without rivets or solder. Oiled for six months. Each one has storm cap. Retail price, size six inch diameter, \$1.00 and upwards; apparatus with which any one can cut circles in glass, is cents each.

Protective Ventilators avoid drafts, exclude dust, dampness, malaria and germs of disease; adopted by hospitals, schools, institutions, &c.; applied to any window or room.

Prof. A. L. Loomis, M. D., University of City of New York, writes as follows: "From my personal experience and that of my patients who have used your Ventilator during the past six months, I am convinced that your method of removing dust, impurities and dampness from the atmosphere is the best which has as yet been proposed. By it the air in an apartment can be constantly changed without causing drafts. I would especially recommend its adoption in sick rooms, sleeping apartments, nurseries and school rooms."

Air Filters and Moisteners, placed over hot-air registers of furnaces, &c., prevent dust and supply steam filtered air. Prices and discounts to the trade sent on application.

The "Economy" Molding Weather Strip is perfect in every respect. By enlarging edge of rubber or felt, and making slot in molding to correspond (see engraving) we save all after expense of molding. Once purchased it will last a lifetime, because rubber, etc., has only to be removed by taking old piece out of either end of molding, and sliding in a new piece. By this method of securing rubber all uncertainty of fastening or undoing of ridge or tack is overcome. Rubber supplied with enlarged edge and instructions to enable Car Manufacturers, Carpenters, Builders and far off trade to make slots in Sashes, Doors, Moldings, &c., and thus make perfect Weather Strips.

No. 6.



BRACHER VENTILATOR CO., No. 3 Park Row, New York.

Bolt and Rivet Clippers,

For cutting off the ends of bolts and rivets, on carriages, wagons, harness, &c.

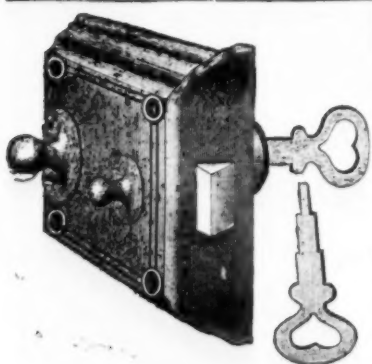
SEND FOR A CIRCULAR AND PRICE LIST.



Liberal discount to the trade.

Chambers, Bro. & Co.,

PHILADELPHIA.



Extension Cylinder Night Latches.

KING'S PATENT, June 26, 1877.

Cylinders adjustable for doors from 1 1/4 inch to 2 inches.

FRANCIS MANY,

143 Chambers St., New York.

FILES & RASPS,

Best Cast Steel. HAND-CUT. Manufactured by **JOHNSON & BRO.**
No. 1 Commercial Street, Newark, N. J.

ESTABLISHED 1860.
Chas. Spruce & Co.,
Manufacturers of HAND CUT
FILES AND RASPS.
Every File warranted.
CHALMERS & MURRAY,
Sole Agents, 76 Reade St., New York.

SPENCER & UNDERHILL,

94 Chambers St., N. Y., Agents for
American Screw Co.'s Wood, Machine and
Rail Screws, Stove and Tire Bolts, Rivets, &c.
O. Ames & Sons, Shovels, Spades and Scoops.
A. Field & Son, Tacks, Brads, Nails, &c.
G. F. Warner & Co., Carriage Clamps.
We have also on hand a general assortment of Hardware.

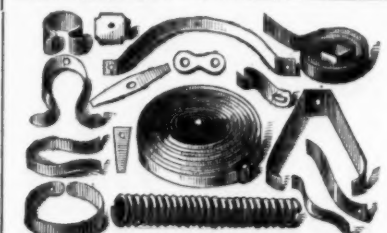


THE GIANT PAD LOCK.
Manufactured by
THE SMITH & EGGE MFG. CO.
(Centennial Award.)

"Superior in Every Respect."
This is one of the best selling Locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited. Address as above.
Lock Box 105, Bridgeport, Conn.

"DRAW CUT"
BUTCHERS' MACHINES.
Choppers, Hand and Power.
Stuffers, Lard Presses.
Warranted thoroughly made and the BEST IN USE.
MURRAY IRON WORK
Burlington, Iowa.

Established 1838.
Bevin Bros. Mfg. Co.,
Easthampton, Ct.
Manufacturers of
SLEIGH BELLS
House, Tea, Hand,
Gong Bell &c.
Bell Metal Kettles

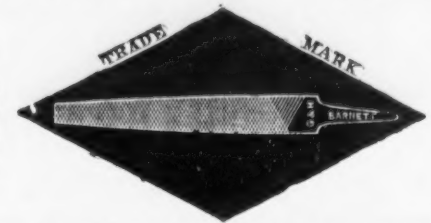


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Manufacturers of
Clock Springs and Small Springs
of every description, from best Cast Steel,
BRISTOL, CONN.

S. L. SAMUEL,
Hardware Manufacturers' Agent
For EXPORT.

Advances made on consignments.
57 Cedar Street, NEW YORK

Black Diamond File Works.



Awarded by Jurors of Centennial Exposition, 1876, for
"VERY SUPERIOR GOODS."

G. & H. BARNETT,

39, 41 & 43 Richmond St., Philadelphia.

CHARLES B. PAUL,
Manufacturer of HAND CUT FILES.

Warranted CAST STEEL. 187 Tenth Street, Williamsburgh, New York.
All descriptions of Files made to order. Price List mailed on application. Established 1863.

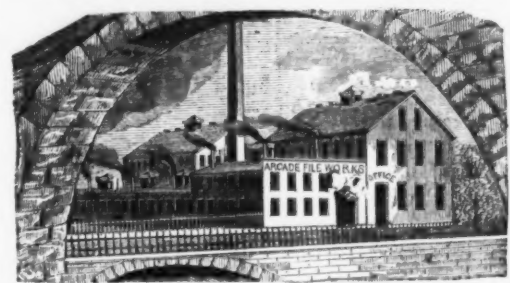
HELLER & BROS.,
Newark, N. J.,
Manufacturers of Celebrated

American Horse Rasps & Files.

ALL CUT BY HAND,
And made of the best American Steel, which have been pronounced unequalled in the market by all experts who have been using them for the last fourteen years, and which are now almost exclusively used in all the principal cities of the United States.
For Sale by Iron and Hardware Dealers generally.

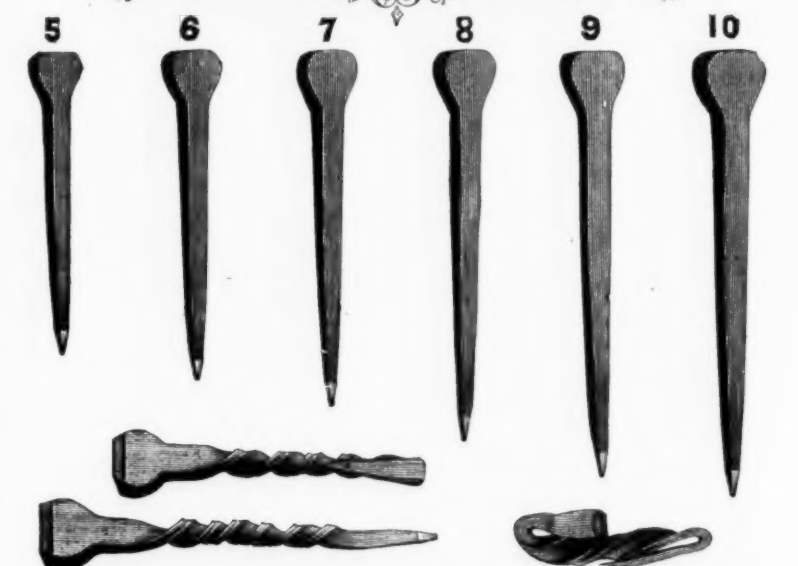
C. T. DRAPER & CO.
Sing Sing, N. Y.
Manufacturers of SUPERIOR
HAND CUT
FILES AND RASPS

ESTABLISHED 1848.



FILES AND RASPS
Made from Best
ENGLISH CAST STEEL.
Quality guaranteed by written warranty
when required.

AUSABLE HORSE NAILS
POLISHED OR BLUED.
HAMMERED AND FINISHED



The Ausable Nails

Are Hammered Hot,
And the Finishing and Pointing are
Done Cold,

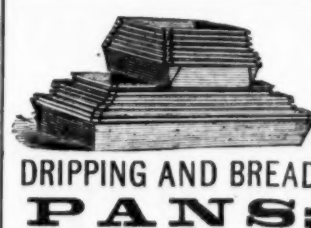
Thus Imitating the Process of Making Nails by Hand.

Quality is **Fully Guaranteed.**

For Sale by all Leading Iron and Hardware Houses.

ABRAHAM BUSSING, Secretary,

4 Warren Street, New York.



DIPPING AND BREAD PANS;

Also Bar, Sheet and Tank Iron and Nails.

LEWIS, DALZELL & CO.,

Pittsburgh, Pa.

Budke's Patent Sheet Iron MEASURES.

Black and galvanized
House, Steamboat, Stable and Well
BUCKETS.

Powder Kegs, Paint,
Putty and White Lead
PAILS.



A. FIELD & SONS, TAUNTON, MASS.



MANUFACTURERS OF

TACKS OF ALL KINDS.

Shoe Nails, Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks, Glaziers' Points, Etc.

OFFICES AND FACTORIES AT TAUNTON, MASS.

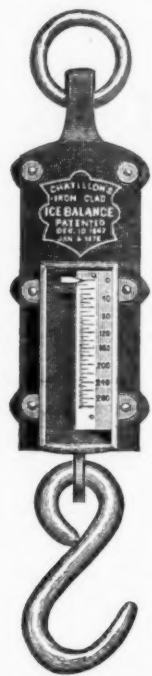
WAREHOUSE AT 78 CHAMBERS STREET, N. Y.,

where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from samples to order.

Hoisting Machinery

MANUFACTURED BY
CRANE BROTHERS MFG. CO.,
Chicago.



IRON CLAD Ice Balance.

200, 300, 400 lbs.

Capacity.

CORRECT,

COMPACT,

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DURABLE.

NOT LIABLE TO GET OUT
OF ORDER.

Universally Approved

BY THE

Ice Companies.

Manufactured only by
John Chatillon & Sons,
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NEW YORK.

Geo. M. Eddy & Co.,
351 & 353 Classon Ave., Brooklyn, N. Y.
Manufacturers of

MEASURING TAPES.

Of Cotton Linen and Steel.

For all purposes for which Tape Measures are required.

Only manufacturers of

Paine's Patent U. S. Standard Steel

Measuring Tapes,

Pat. Spring Measuring Tapes

of Linen and Steel.

FINE TEMPERED STEEL SPRING.

FINE TEMPERED STEEL HAND SAWS.

From 4 inch wide upward. Warranted tougher than

any other Hand Saws. Catalogues on application

PRIZE MEDALLISTS:

London, 1862; Oporto, 1865; Dublin, 1865; Paris,
1867; Moscow, 1872; Vienna, 1873, and only
Award and Medal for Self-Coiling Steel
Shutters at Centennial Exhibition,
Philadelphia, 1876.

CLARK & CO.,

ORIGINAL INVENTORS AND SOLE

PATENTEES OF

Noiseless Self-Coiling Revolving

STEEL SHUTTERS,

FIRE AND BURGLAR PROOF.

Also Improved

Rolling Wood Shutters

Of various kinds. Clark's Shutters are the best
and cheapest in the world. Are fitted to new
Trabane Building, Lenox Library, Delaware and Hud-
son Canal Co.'s Building, Transatlantic Steamship
Co.'s new Dock, American News Office, &c., Posey
County Court House, Mt. Vernon, Holt County
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Cincinnati, Detroit, Janesville, Wis., Baltimore,
Canada, &c. Have been for years in daily use in
every principal city throughout Europe, and are in-
vited by the Leading Architects of the
World.

Office and Manufactory,

162 & 164 West 27th Street, N. Y.

ANSONIA CORRUGATED STOVE PLATFORM

Manufactured by the

Ansonia Brass & Copper Co.

Office, 19 & 21 Cliff Street,

NEW YORK.



Cut Showing Round Platform.

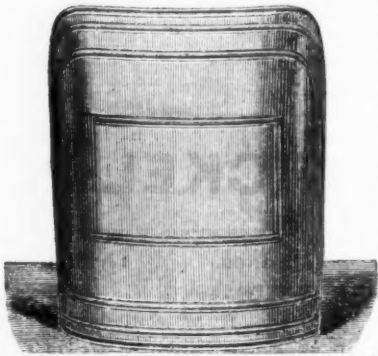
Section Showing Edge.

ANSONIA Bronzed Fire Screen,

With Ornamented Mouldings.

PATENT APPLIED FOR.

The Portable Bronzed Fire Screen or
Shield, as shown in the illustration, is especially
designed for the safety and protection of walls, fur-
niture, woodwork, paper or varnish from heat.
Being constructed of metal, with firm and substan-
tial edges, curved in form to stand alone, it may be
easily adjusted to any position about a stove, before
a grate or fire place. The demand for something
useful, durable and ornamental as a Fire Screen has
long been felt, and having finally accomplished the
desired result, we are prepared to fill all orders
promptly.



CHAINS

UNION CHAIN WORKS,
REITER & MORTON,
Pittsburgh, Pa.

Manufacture all kinds of

Coil, Cable, Crane, Railroad, Wagon and Agricultural Chains,
From Best Standard Brands of Iron.

Our Chains are all thoroughly tested and warranted, and will be found equal to the
best of either home or foreign make.

Prices the very Lowest.

PHILIP S. BIGLIN.

Successor to W. F. SHATTUCK & CO.,

Manufacturers' Agent for

AMERICAN HARDWARE,

100 Chambers St., New York.

Shattuck's Union and Counter Scales.
Phelan's Axes, Hatchets, Picks, &c.
Wellman's Gimlets, Gimlet Bits, &c.
Griswold's Augers, Auger Bits, &c.
Hilroyd & Co.'s Stocks and Dies.
Fawcett's "Genuine" Wrought Cow Bells.
Barton's Hand and Sleigh Bells.

Maltby's Britannia and Corona Dippers.
Eddy's Reduced Lamp Black.
"Eagle" Axe, Pick and other Handles.
"Eureka" Flint, Sand and Emery Papers.
Cortland Forged Horse Nails.
Tackle Blocks, Spokes, &c., &c.

DARLING, BROWN & SHARPE

Providence, Rhode Island,

MANUFACTURERS OF

United States Standard Rules,

AMES' UNIVERSAL SQUARES,

Patent Hardened Cast Steel Try Squares,

THE AMERICAN STANDARD WIRE GAUGE,

Bevel Protectors, Hardened T Squares and Bevels, Center Gauges,

Steel, German Silver & Boxwood Triangular Scales, Vernier

Calipers, Caliper Squares and Rules, Plumb Bobs,

Paper Drawing Scales, Willis' Odontographs, Steel Straight Edges,

and T Square Blades.

MEDALS AWARDED: Paris Exposition, 1867; Vienna Exposition, 1873; Philadelphia, 1876.

Illustrated Catalogue sent per mail on application.

Scientific and Technical Notes.

A firm of shippers in Glasgow have pat-
ented a

HYDRAULIC CLEANER FOR SHIPS' BOTTOMS
which is well spoken of. The apparatus
consists of a small portable hydraulic ma-
chine and keel-catcher. On the machine is
placed a rotating brush, which is put in mo-
tion by a turbine. A canvas hose connects
the turbine with a hand or donkey pump.
The keel-catcher will travel and retain its
hold on any curved stem or straight keel by
means of conically-shaped india-rubber rol-
lers, which are moved either forward or aft
by means of an endless rope from the deck.
In commencing the operation the keel-
catcher is adjusted to the stem of the vessel,
above the water line, and lowered by the
pulling of the endless rope. The machine,
moved toward the keel by the rope passing
through the keel-catcher, will, owing to the
uplift buoyancy, press the revolving brush
against the ship's side, whatever its shape,
and clean it effectually. When the machine
is felt to have reached the keel, the rope
attached to its tail pulls it upward. After it
has reached the water-line the operation is
repeated, the keel-catcher and pulling ropes
being shifted the length of the brush nearer
the stern, so that a fresh strip of the hull is
cleaned. The machine works up and down
in this way, until it reaches the stern, and
when one side of the vessel is cleaned the
machine is attached to the other side and
worked as before. The bottom of the Allan
steamer Corinthian was cleaned in this way
as she was coming up the river, and an in-
spection after she had reached the gearing
dock showed that it had accomplished the
object perfectly.

At a recent meeting of the Academy of
Sciences in Washington, Prof. Alex. Agassiz
gave an interesting description of

THE BOTTOM OF THE OCEAN

in an account of the results reached by the
Blake expedition, with which he was con-
nected. He has passed over, for purposes of
sounding and survey, a distance of 1800
miles in and adjoining the Gulf of Mexico.
The work of observation was begun at the
point where it had been left off by his pre-
decessors in deep-sea dredging for that
region—his father, Prof. Louis Agassiz, and
Count Portales. They had, indeed, run one
or two lines of dredging across the gulf, but
it was done with the imperfect appliances of
that day and brought no complete results.
In depths exceeding 500 fathoms, for in-
stance, Count Portales found little animal
life, and at that time there was a general
belief that the limit of existence had been
nearly reached at such depths. The follow-
ing observations are reported by Prof.
Agassiz: Where the depth is 1800 to 2000
fathoms inside the Windward Islands, the
fauna corresponds to that of the Atlantic
outside, the animals having doubtless pene-
trated through the openings between the
islands. All classes of the animal king-
dom found in the ocean are well rep-
resented. Inside the Caribbean Sea, the
fauna is more specialized and characteristic.
On the Challenger expedition it had been
ascertained that the red clay ooze of the
ocean bottom was largely the result of the
decomposition of the shells of surface animals
—a disintegrated portion of the limestone
contained in those shells. Everywhere in the
gulf a similar deposit was found. Pelagic ani-
mals, chiefly mollusks, may be said to fill this
sea from the surface to 8, 10 or 25 fathoms
in depth. There is no doubt that a stratum
is forming at the bottom of the sea, due
entirely to the coverings and hard parts of
pelagic animals which exist in swarms near
the surface. On the question as to the ex-
istence of many animals in deep water, near
neither the surface nor the bottom, Prof.
Agassiz is inclined to distrust the Challenger
observations. The apparatus there used
could not furnish proof as to the point
whether the animals were really caught at
the depth of 1000 fathoms or near the sur-
face. Prof. Agassiz is not yet prepared to
throw additional light on the question of
sight by pelagic animals at great depths.
The fact remains that at these depths there
are found creatures of two classes in respect
to vision: one eyeless, or nearly so, and
with curious changes of structure taking the
place sometimes that the eyes should occupy;
others in a totally opposite condition, having
eyes enormously developed, as if to enable
them to see with the smallest modicum of
light. This is true at depths of 1500 to 1900
fathoms or more, both as to crustaceans and
fishes. It seems strange that the same con-
ditions should have produced diametrically
opposite results.

A novel process of

ANNEALING GLASS

has been recently invented by Baron Albert
and M. J. M. A. Weyer of Paris. It con-
sists in burying the articles to be annealed
in powdered stone, plaster, lime, fire-clay,
&c., or in grease, oil, the melted nitrates of
potash and soda—in fact, any liquid or solid
capable of receiving the required heat and
remaining in a condition suitable for the pro-
cess. By this means glass articles are not
only rendered more capable of sustaining
sudden transitions of temperature, but they
are also strengthened to a considerable de-
gree. The method of imbedding the articles
in powder renders it possible to anneal at a
very high temperature, which is impossible
unless some means are provided for support-
ing the articles and maintaining their shape
when reduced to the softened state neces-
sary to secure perfect annealing. By the
new process the articles are filled with the
powdered stone or other substance, and are
then placed in crucibles and completely sur-
rounded with the pulverized substance em-
ployed, being covered to a depth of at least
2 inches. The crucibles are then subjected
to a heat gradually increasing to 1472° F.,
or even to 1832° F., in a suitable oven for
from four to six hours, and are then slowly
cooled, the operation lasting for 24 hours
when the articles are thick. Where there
is little danger of spoiling the shape of the
articles, the method of annealing by use of
liquids gives similar results more rapidly and
at less cost. In carrying out this process two
boilers are employed, so placed that the
liquid can be run from the upper into the
lower. If nitrate of soda is employed the
temperature will be over 500° F. before the

salt is melted, and the articles are then im-
mersed in the cold state, and the tempera-
ture raised in that case to 1472° F., the
highest degree possible with nitrate of soda.
They are then allowed to cool slowly, and
when the temperature approaches 500° F.,
or solidification point, the nitrate is run off
into the lower boiler and a small fire is main-
tained beneath the upper boiler to prevent
the too rapid cooling of the glass. By this
means the articles are perfectly annealed
without injury to the surface or the shape.

In a paper read before the French Acad-
emy of Sciences, M. Couste has ascribed the

DAILY OSCILLATIONS OF THE BAROMETER

to variations, first, in the quantity of aque-
ous vapor in the atmosphere, and, second,
in currents ascending vertically. The latter
are formed partly by the dilated air, but
chiefly by the evaporation of water by the
sun in the low and middle layers of the at-
mosphere and its condensation anew in the
upper layers.

Mr. Daurie, the great French geologist,
has attempted to prove recently that the

TRANSFORMATION OF ROCKS

may be produced by the heat which may be
developed by mechanical action. He rotated
rapidly a circular plate on a vertical axis,
and applied to a small part of its surface
near the circumference a small weighted and
fixed marble plate, measuring the rise of the
temperature of the latter with an alcohol
thermometer. In one minute, with 445 rev-
olutions, there was an increase of 4.5° C.
The mode of producing so-called

MUSLIN GLASS

is the following: After carefully cleaning
the surface of a plate of glass, an even layer
of vitrifiable color is laid over it, with the
aid of gum water. The glass is then sub-
mitted to a gentle heat until the water has
evaporated, when a stencil of the desired
pattern is laid over the surface, and with a
stiff brush the pigment is removed from the
parts which are to be transparent. The
glass is next inclosed in a frame, and above it
is extended a piece of tulle, or, if desired,
embroidered lace, the embroidery in the
latter case being so disposed as to harmonize
with the ground pattern previously made.
The whole is then hermetically closed in a
box which contains in its lower portion a
reservoir holding a certain quantity of dry
color in the form of an impalpable powder.
This is blown evenly upon the glass by an
air blast, adhering to it wherever the
surface is not protected by the threads of
lace. In this way the pattern of the latter
is defined. In order to fix the powder the
sheets of glass are exposed to steam, which
moistens the gum and causes the powder to
adhere. The color is then burnt in a special
furnace.

The Revue Industrielle gives a description
of a new

PNEUMATIC GRAIN ELEVATOR,

constructed by Renhay. It consists of a
centrifugal ventilator, the suction pipe of
which is carried to a receiver placed upon
the level to which the grain is to be carried.
From the same receiver the supply pipe runs
to the place from where the grain is to be
lifted. Between the openings of the suction
and the supply pipe of the receiver is an in-
clined plane, which throws the grain down-
ward. A screen prevents the grain from
entering the suction pipe, through which
only the dust is carried off. A piston regu-
lator at the lower end of the supply pipe acts
in such a manner upon an adjustable nozzle
that the proper proportion between the
amounts of air and grain admitted is auto-
matically maintained. The principle upon
which this pneumatic elevator acts is that
when solid particles in movement in a pipe
are mixed with air, a semi-fluid is formed in
which the pressures vary in accordance to
the laws governing ordinary fluids.

The well-known inventor and manufac-
turer of nitro-glycerine and dynamite, Alfred
Nobel, has added another explosive to the
list, the

EXPLOSIVE "JELLY POWDER,"

so called from its resemblance to calf's foot
jelly. It consists of 94 or 95 per cent. of
nitro-glycerine and 5 or 6 per cent. collodion
cotton, so mixed as to assume a gelatinous
form. It is tough, but can be easily cut
with knives or shears, and applied to cart-
ridges or balls. It is water-proof, acts in
the same way as dynamite, but is at least
50 per cent. stronger, and does not possess
the great defect of the latter in parting with
its nitro-glycerine when damp.

Dr. Wiesner has discovered in phloroglu-
cin an extraordinarily delicate

TEST OF WOOLY FIBER.

If a drop of a half per cent. solution of
phloroglucin is placed upon a bit of pine,
and the spot is moistened with a drop of
hydrochloric acid, a beautiful red stain, ver-
ging upon violet, immediately appears. The
slightest traces of wooly substance in vegeta-
ble tissues can be readily detected in this
manner. The tenderest germs, by means
of this reaction, show a woodiness in the
cells. Every trace of wooly substance in
hemp and flax can be detected by the phlor-
oglucin. Dr. Wiesner suggests that it may
be used to distinguish hemp from flax, and
also as a means of dyeing fabrics woven
from vegetable fibers.

The export trade in hardware increased
during the first quarter of 1878 in Great
Britain as well as in America, but we are
making the greatest headway, compara-
tively, and our goods are gaining more
popularity every day. Since Jan. 1 our
shipments, as well as those of Great Britain,
have advanced in the West Indies on ac-
count of an increased demand. Germany,
Canada and the United States are importing
more freely from England than heretofore.
The Spanish West Indies, Argentine Repub-
lic, India and British North America are
absorbing the increased trade of Great
Britain, while the greatest decline of the
exports of the latter is with Holland and
Russia. It is difficult to make a fair com-
parison of our hardware exports with those
of Great Britain, as her Board of Trade do
not divide the returns into classes. Eng-
land, however, is not falling off this year,
and, in fact, did not show a large decrease
in 1877—only 4 per cent. of value, which
represents a reduction of price, not of quan-
tity.

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Per Gross.		Per Gross.		Per Gross.		Per Gross.		Per Gross.		Per Gross.		Per Gross.		Per Gross.		Per Gross.		Per Gross.		Per Gross.		Per Gross.		
No. 4,	\$0.84	No. 8,	\$1.40	No. 10,	\$1.05	No. 11,	\$1.85	No. 11,	\$1.94	No. 11,	\$2.10	No. 10,	\$2.15	No. 7,	\$2.15	No. 9,	\$2.40	No. 10,	\$2.85	No. 10,	\$3.45	No. 14,	\$4.00	
5,	0.93	9,	1.55	11,	1.82	12,	2.00	12,	2.10	11,	2.25	11,	2.38	8,	2.20	10,	2.50	11,	3.00	11,	3.55	16,	5.40	
6,	1.07	10,	1.63	12,	1.95	13,	2.35	13,	2.45	13,	2.60	12,	2.50	9,	2.30	11,	2.70	12,	3.25	12,	3.65	18,	6.55	
7,	1.20	11,	1.80	13,	2.30	14,	2.50	14,	2.70	14,	2.80	13,	2.85	10,	2.40	12,	3.00	13,	3.75	13,	4.00	20,	8.15	
8,	1.35	12,	1.90	14,	2.45	15,	2.75	15,	2.95	15,	3.24	14,	3.15	11,	2.55	13,	3.45	14,	4.00	14,	4.25	3 INCH.		
9,	1.50	$\frac{3}{4}$ INCH.		$\frac{7}{8}$ INCH.		1 INCH.		$1\frac{1}{4}$ INCH.		16,		3.68	15,	3.50	12,	2.80	14,	3.75	15,	4.30	15,			4.75
10,	1.60	$\frac{3}{4}$ INCH.		$\frac{7}{8}$ INCH.		1 INCH.		$1\frac{1}{4}$ INCH.		17,		4.00	16,	3.90	13,	3.12	15,	4.05	16,	4.80	16,	5.10	No. 14,	5.00
$\frac{5}{8}$ INCH.		No. 4,	.90	No. 6,	1.21	No. 6,	1.27	No. 6,	1.50	18,	4.40	17,	4.40	14,	3.45	16,	4.40	17,	5.20	17,	5.55	16,	6.10	
No. 4,	.88	5,	1.04		7,		1.40		7,	1.55	$1\frac{1}{2}$ INCH.		18,	4.80	15,	3.80	17,	5.00	18,	5.70	18,	6.10	18,	7.55
	.98	6,	1.16		8,		1.53		8,	1.65	No. 7,	1.88	20,	5.85	16,	4.10	18,	5.40	20,	6.75	20,	7.30	20,	9.15
	5,	1.13	7,		1.30		9,		1.68	9,		1.80	17,	4.60	18,	5.10	20,	6.05	20,	6.50	20,	7.30	20,	9.15
	6,	1.13	8,		1.44		10,		1.75	10,		1.95	8,	1.94	9,	2.05								
7,	1.25	9,	1.57	10,	1.69	10,	1.75	10,	1.95	9,	2.05													

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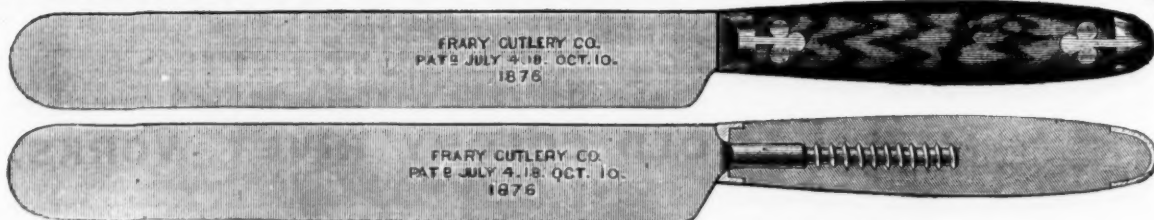
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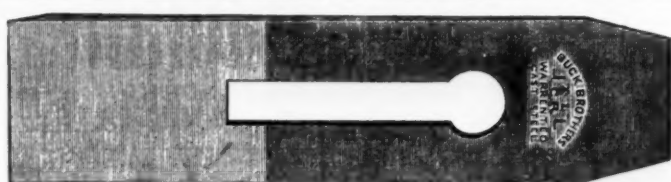
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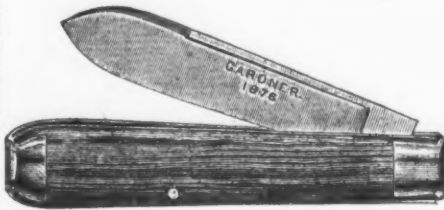
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Extract from the Norwegian Tariff.

* Steel and bar iron, spikes, screws and nails, whether tinned or not, free; steel and iron in rods, whether copper-faced or galvanized or not, free; all metals in the raw state, i. e., in ingots, pigs, &c., free; all machinery and parts thereof for industrial, marine or agricultural purposes, and machinery belting, free; fish hooks, free; guns and pistols, free; cannon and projectiles, free; steel and other metal wire, covered, per lb., 3 1/2 c.; knives of all sorts, per lb., 11 c.; steel and iron wire, free; needles, per lb., 7 c.; artisans' and other tools, free; other hardware and side arms, per lb., 1 1/2 c. to 4 1/2 c.; wrought iron, free; enameled sheet iron, per lb., 4 1/2 c.; pig, sheet and pipe lead, free; lead, shot, foil and ware, per lb., 1 c.; tin, block, sheet, rods, pipe and scrap, free; ditto, gilt and plated, per lb., 9 1/2 c.; tin foil and tinware, per lb., 4 1/2 c.; spelter and zinc, in slabs, sheets, rods and pipe, spikes and wire, free; ditto, cast into statues of over 50 lbs. each, free; zincware, gilt and plated, per lb., 9 1/2 c.; ditto, bronzed, varnished, lacquered and painted, 4 1/2 c.; copper and brass and all alloys of copper in wire, ingots, bolts, sheets, nails, rods and pipe, free; sheet copper and plated copper manufactures, per lb., 9 1/2 c.; manufactures of copper and brass wire, per lb., 4 1/2 c.; ditto, cast into statues of over 50 lbs., free.

Clock movements, without case, per lb., 32 c.; clock cases, wooden and other material, per lb., 9 c.; mantel-piece clocks, in cases, of metal or china not exceeding 16 lb., per lb., 14 c.; large ditto, each, \$2.16; ditto in cases of other material not exceeding 10 lb., per lb., 14 c.; large ditto, each, \$1.35; tower clocks and other large sizes, per lb., 9 c.; watches and chronometers, each, 27 c.; gilt and plated ware, per lb., 9 1/2 c.; ditto of polished iron, per lb., 4 1/2 c.; jewelry not of gold and silver, per lb., 11 c.; gold and silver leaf, free; bronze powder, free; gold fringe, &c., per lb., 32 c.; gold pens, per lb., 8 c.; all gold, silver, aluminum and platinum ware, half ounce, 2 1/2 c.; plumbago, per lb., 3 c.; lead pencils, per lb., 4 1/2 c.; musical instruments—Pianos, each, \$10.50; guitars, violins, violoncellos and counterbasses, each, 27 c.; flutes, oboes and clarinets, each, 13 1/2 c.; cases for ditto, each, 5 c.; microscopes, per lb., 4 1/2 c.; lamps, per lb., 4 1/2 c. to 9 c.; type, free; borax, free; white lead, per lb., 3 c.; paints in oil, per lb., 3 c.; varnishes, per lb., 3 c.; axle grease, free; asphaltum and manufactures, free; turpentine and pitch, free; naphtha and coal tar, free; petroleum, per lb., 5 c.; spirits of turpentine, per lb., 3 c.; stearine, paraffine and oleine, per lb., 3 c.; ditto candles and tallow ditto, per lb., 1 1/2 c.

Coal and coke, free; chalk and cement, free; saltpeter and nitrate of soda, free; potash, free; printing presses, free; school slates and pencils, free; earthenware, common, such as drain pipe and pottery, not glazed, free; stoneware, china and porcelain, per lb., 3 c. to 3 c.; glassware, such as bottles, retorts, telegraph tops, optical glass, &c., free; other ditto, per lb., 1 1/2 c. to 3 1/2 c.; brushware, coarse, with wood or metal, per lb., 1 1/2 c.; ditto with horn, per lb., 6 1/2 c.; india rubber and gutta percha; also, coarse manufactures thereof, free; ditto finer goods, per lb., 13 c.; glue and gelatine, free; raw hemp and jute, free; hides, skins and hide cuttings, free; prepared ditto, per lb., 4 1/2 c.; horse-hair, free; leatherware, per lb., 4 1/2 c.; leather and sole leather per lb., 1 1/2 c.; saddlery, per lb., 8 c.; furs, fine, not dressed, per lb., 32 c.; ditto, manufactured, per lb., 39 c.; ditto, common, raw, per lb., 4 1/2 c. to 14 c.; Sand and emery paper, free; writing and drawing paper, also colored and playing cards, per lb., 1 1/2 c.; blank books, per lb., 3 1/2 c.; printing and wrapping paper, free; telegraphic instruments and cables, free; vessels, free; nitroglycerine and dynamite, free; fish oil, free; bone black, free; cabinet woods, per lb., 1 1/2 c.; mechanics' wooden tools, free; other woodenware, per lb., 4 c. to 4 1/2 c.; staves and cooperage stuff, 10 per cent.; ditto, entered at the custom houses of Hammarfest, Vardo and Vedsoe, 6 per cent.; all rolling stock for railroads, free; children's carriages, each, 32 c.; farmers' and other carts, free; carriages, each, \$2.16 to \$10.80; wax, per lb., 3 1/2 c.; ditto candles and tablets, per lb., 1 1/2 c.

Rapid Transit in Brooklyn.—So much has been said of late respecting various schemes for rapid transit in Brooklyn, that our reporter called upon Mr. Felix Campbell, President of the Board of Transit Commissioners in that city, who remarked that of the whole number only one or two have any substantial backing. The rest emanate from engineers seeking notoriety. The Steam Transit Company, which broke ground on Saturday near the Fulton ferry, is not acting in conjunction with the commissioners, but under their charter, such as it is. The latter requires that one mile of road be built before July 1st, but as this feat can hardly be executed within so brief a time, it is surmised in some quarters that the "start" is made with the hope that they will be enjoined from proceeding further, or possibly with the intention of enjoining themselves, and thus perpetuating their chartered rights. However this may be, the question of rapid transit in the "city of churches" remains all in a smudge, with no very cheering prospects for lack of ready money.

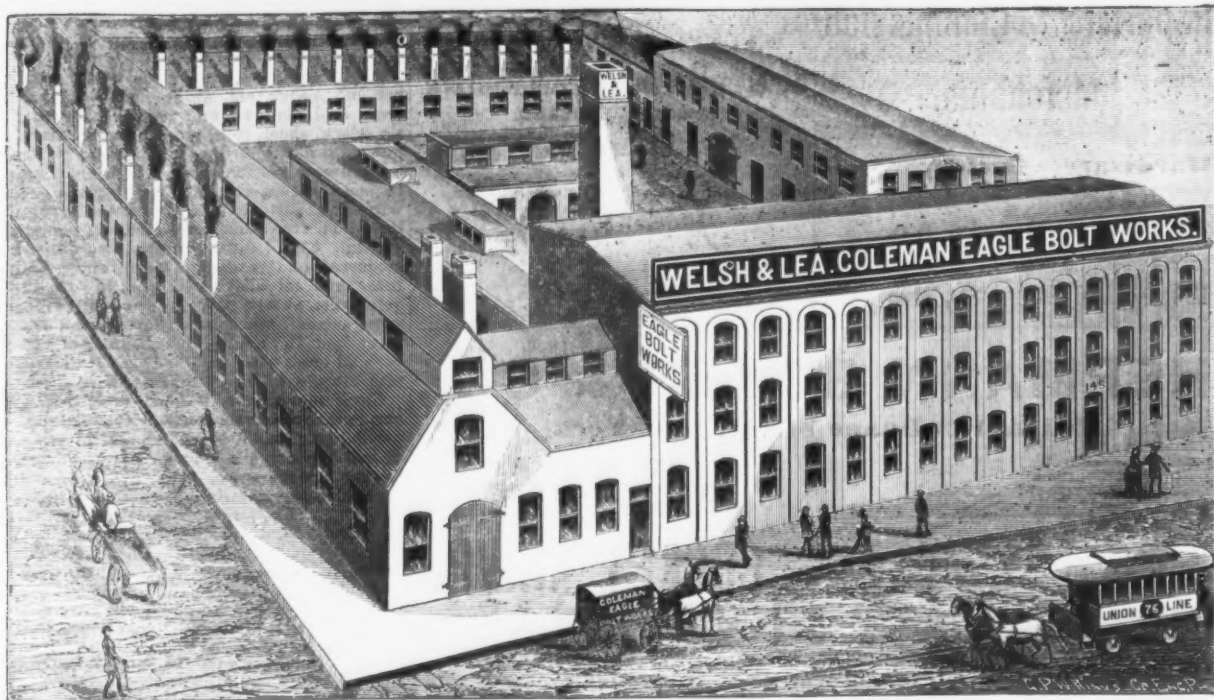
Canada Steel Co.—We learn that the business of this company is increasing so fast that they propose to double the capacity of the present works. Another fine engine from the Baldwin Locomotive Works has been added, which now makes the fourth in use at the works—two of the 3-foot gauge and two of the 4-foot 8 1/2-inch gauge. We are informed that last month this company paid no less than \$8000 freight to the Intercolonial Railway department. About two car loads of manufactured iron are daily dispatched from Londonderry station, and large quantities of coal from Pictou and limestone from Brookfield are received. —Maritime Sentinel.

* The Norwegian coin is the same as the Danish. The pound is equal to 1.253 pounds American.

COLEMAN EAGLE BOLT WORKS

ESTABLISHED 1845.

WELSH & LEA.



NORWAY IRON CARRIAGE & TIRE BOLTS, AXLE CLIPS, &c.

WORKS, Columbia Avenue, Hancock and Mascher Streets.
OFFICE, 145 Columbia Avenue (late 2030 Arch St.),
PHILADELPHIA.

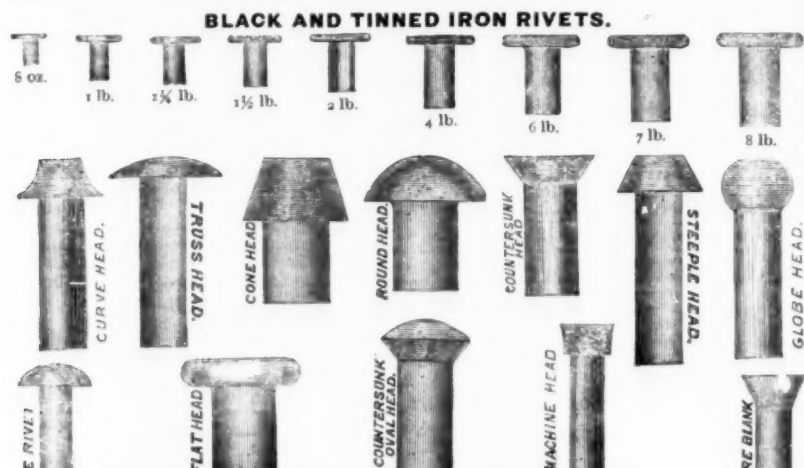
Philadelphia "STAR" Bolt Works.

NORWAY IRON FANCY HEAD BOLTS,
Carriage & Tire Bolts. Star Axle Clips, &c.
TOWNSEND, WILSON & HUBBARD, 2301 Cherry St., Philadelphia, Pa.

HOOPES & TOWNSEND,

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Machine & Car Bolts, COLD PUNCHED
Square and Hexagon
Nuts, Washers, Chain Links.
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Unequaled in Quality and Finish.



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Manufacturers of every description of First Quality.

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Manufacturers of
Carriage & Wagon AXLES,
WINSTED, CONN.
ESTABLISHED 1839.

PATENT CONVEX Fluting & Smoothing Iron.



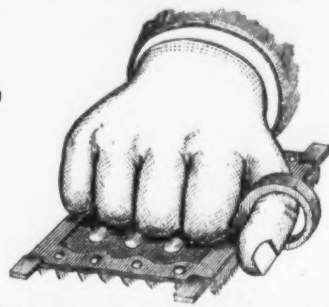
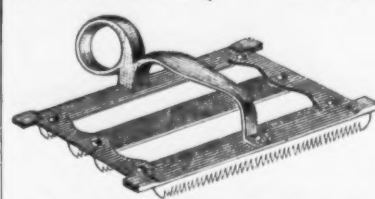
1st. It can be used as an ordinary Smoothing Iron.
2d. It is a Fluting Machine as well as a Smoothing Iron.
3d. The Fluting Attachment being made of brass, and convex in form, it has all the advantages of the crank machine.
4th. It combines the two articles in one, taking up the room of but one machine, and is always ready for use.

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No. 89 John Street, New York.

TUCKER & DORSEY, MANUFACTURERS.



HOTCHKISS' Novelty Combs.



We ask the attention of the public to our Patent Novelty Curry Combs, represented above, which are universally acknowledged to be far superior to anything in the market, being neat and durable and the most convenient to handle of any comb yet produced. They are put up in paper boxes of one dozen each, and packed 24 dozen in a case. GIVE THEM A TRIAL. For Sale by the jobbing Hardware, Saddlery and Woodenware trade.

HOTCHKISS' SONS, Bridgeport, Conn.

LEWIS, OLIVER & PHILLIPS,

PITTSBURGH, PA.,

MANUFACTURERS OF

Heavy and Wagon Hardware, BOLTS AND NUTS

OF ALL KINDS,



Screw Hook and Strap and T Hinges,
Etc. Etc.

Send for lithographs and price lists.



Our Yokes are all warranted the best second-growth hickory and vary in finish from common to the finest Yokes in use, and our Adjustable Neck Yoke Leather combines neatness, strength and durability. They cost less and are far superior to any other way of leathering yokes. Sample Leather sent by mail on receipt of 60 cents.

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Our Standard Springs, weighing about half as much as the Springs of other makers, to do the same work cost but little more per vehicle than a common Spring. Our Jamb-screw, Collinge Collar, Parallel Arm, Malleable Iron Box Axles are the best in the world. Exclusive makers of
LEWIS'S TORSION AND CROSS SPRINGS.
Supercedes the Brewster Cross and End, dispenses with side spars, weigh less, hangbody equally low, ride easier and cost less. Shop newly stocked with new and improved Machinery. Send for Price Lists
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Universal Ratchet Drills, and Patent Tinner's Snips.
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BRIDGEWATER, MASS.,

Manufacturers of DAMAN STANDARD HOLLOW AUGERS.—Universally acknowledged superior to any other in the market. They have recently been improved, making them, as now offered to the trade, the most perfect tools of their kind, either in design, material or workmanship. SPOKE AND BOWEL TIMBERS.—The very best as well as the cheapest. METALLIC COMBINATION FLOW PLANE.—Made of solid cast steel and of our metal. Of an entirely new design. Can be used as Groover, Dado and Rabbet Plane, in any direction of the grain, and also as a Match Plane. COMMON SENSE DOOR SPRING.—The most durable and cheapest Door Spring yet made. LEAD PIPE CUTTERS.—To cut lead pipe in any position and without chips or burrs. Please send for circulars and prices.

DOG MUZZLES.

The Patent Automatic, with Spring Jaw.
COMMON WIRE MUZZLES,
New Pattern, in nine different sizes. Also full and varied line of Metal and Leather

DOG COLLARS.

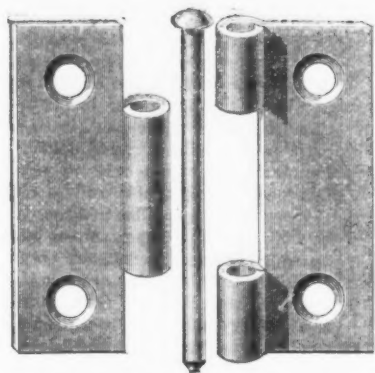
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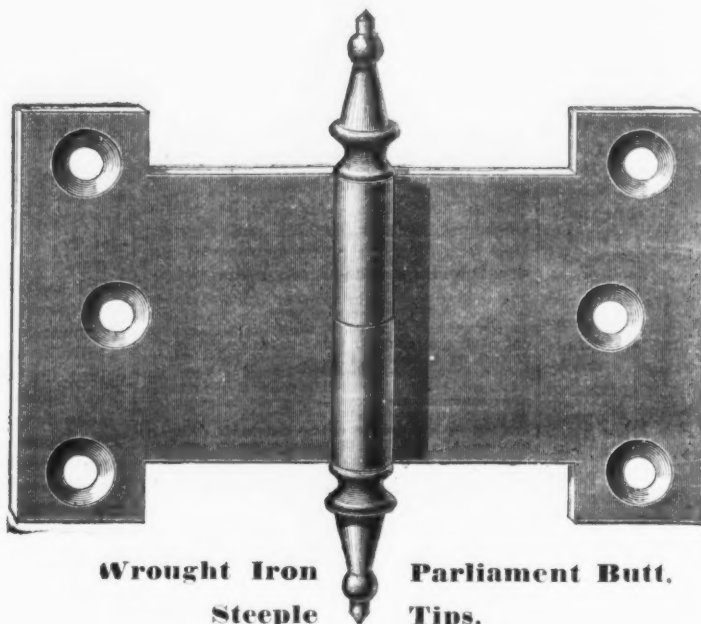
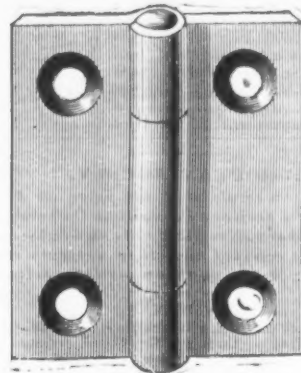
THE STANLEY WORKS,

Manufacturers of

WROUGHT IRON BUTTS AND HINGES, WROUGHT FLUSH AND DOOR BOLTS.



Loose Pin Light Narrow Butt.

Wrought Iron Parliament Butt.
Steeple Tips.

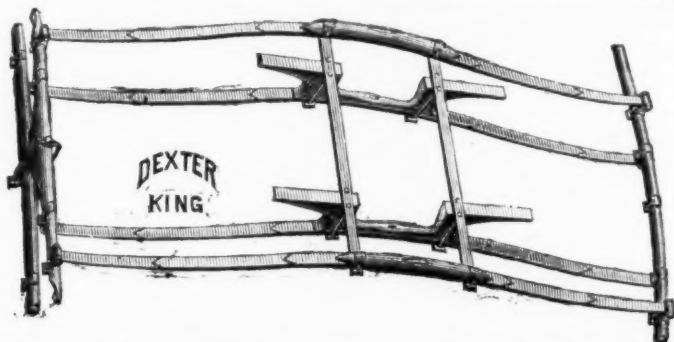
Wrought Narrow Butt.

Wrought Iron Parliament Butts, as shown above, are furnished Japanned, With Japanned Wrought Iron Tips and with Silver or Nickel-Plated Brass Tips; Bronzed and Nickel Plated, with or without Tips; also Plain and Japanned, without Tips. Being made of Wrought Iron, their lightness and strength make them the most desirable Butts of the kind in market. Sizes are: 2½, 3, 3½, 4, 4½, 5, 5½, 6, 7 and 8 inch when open.

FACTORIES, New Britain, Conn.

WAREHOUSE, 79 Chambers St., New York.

THE
DEXTER AND



THE
DEXTER KING

CARRIAGE SPRINGS.

The **DEXTER** consists essentially of two "concord" or side springs upon each side. The two springs are rigidly attached to each other at their centers, and are pivoted at their ends to spring links above, or on either side of the axle or head block. The spring shackles are rigidly attached to the head block and rear axle respectively. The parallel motion of the springs prevents rocking of the axles. One spring being above the other prevents side motion and the settling of the body to one side. The absence of a reach allows either wheel to pass over an obstruction almost independently of the other wheels. The elasticity of the springs takes much strain off the fifth wheel, and cushions the stroke when striking an obstruction.

The **DEXTER KING** Springs are similar to the Dexter, but the lower ones are nearer together and under the body, dispensing with the spring-bar. The Fifth Wheel is very simple, durable and pretty. All the Spring Shackles, Irons, Bolts, Fifth Wheel, etc., are Norway wrought drop forgings, thereby insuring neatness and uniformity.

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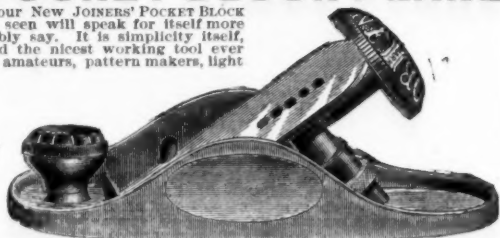
DEXTER SPRING COMPANY, Hulton, near Pittsburgh, Pa.

W. W. GRIER, Secretary.

L. BAILEY'S POCKET BLOCK PLANE

We desire to call special attention to our New JOINERS' POCKET BLOCK PLANE. We believe this tool when once seen will speak for itself more pointedly than anything we could possibly say. It is simplicity itself, both in construction and operation, and the nicest working tool ever made, and specially recommended for amateurs, pattern makers, light scroll saw work, etc., etc.

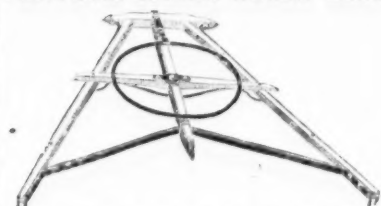
No. 12, 4½ in. in length, 1½ in. cutter, Japan'd finish, polished trim- mings.....	each.	per doz.
	\$0.50	\$6.00
No. 12½, 4¾ in. in length, 1½ in. cutter, Japan'd finish, nickel-plated trimmings.....	1.00	12.00



Sent by mail, postage paid, on receipt of price. Patented October 9, 1877.

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EUREKA PLATFORM SPRING WAGON GEAR.



Patented in the United States and Canada.
The attention of Manufacturers and of the Carriage Hardware Trade is respectfully invited to the Eureka Platform Spring Wagon Gear.
This Gearing is far ahead of all others in strength and light appearance. It is the strongest and most perfect gear in use, and is meeting with a large sale. Manufacturers of Platform Wagons will use no other after a trial of this.

PRICE.
\$7.00 for Trestle warranted to carry 1000 lbs.
7.50 " " " " 1500 "
8.50 " " " " 2000 "
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For circulars and full information address
ROME TRESTLE COMPANY, Limited,
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MICROMETER CALIPER,
Made by THE VICTOR SEWING MACHINE CO.
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This attractive and very desirable tool will be found more reliable and convenient than the Vernier Caliper, and to Machinists and Tool makers it is indispensable on work requiring very accurate and close measurement. Its capacity is one inch, and is graduated to one thousandths, but can readily be set one-half and quarter thousandths; and is so constructed that any wear resulting from use can be readily adjusted.

IRON AND STEEL DROP FORGINGS

All shapes, small and large, including
Grip, Pistol, Wrench Bars, &c. Also, Die Sinking. Manufacturers also of
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Round and Head Knives.

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The Stamped Stove Pipe Elbow, HOGEN'S PATENT.

The Stamped Elbow has neither Crimps, Cavities nor Angles which cause accumulations that rust or corrode the Iron.

OFFICE AND WORKS, Wason St. on Lake Shore, CLEVELAND, O.

The Iron Age.

New York, Thursday, June 6, 1878.

DAVID WILLIAMS Publisher and Proprietor.
JAMES C. BAYLES Editor.
JOHN S. KING Business Manager.

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Remittances may be made at our risk by post office money order, draft on a New York or Philadelphia bank, or in a registered letter.

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83 Reade Street, New York.

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AUSTRALIAN AGENCY.

The American Hardware Company, Melbourne, are our agents for Australia. Sample copies will be mailed by them, free of charge, to any firm engaged in the trades we represent in Australia, Tasmania and New Zealand.

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Our English friends are likely to suffer more than we shall from the adoption by Russia of a protective policy. The Russian Minister of Finance has prepared for the consideration of the Imperial Council a project for increasing the duties upon all iron and steel goods in bar or ingot, or manufactured into rails, locomotives or carriage fittings, entering Russia from abroad. The

duty upon rails will be about \$7.30 per ton; upon bar iron, \$12.65, and sheet iron, \$18.25. We do not understand that the proposed tariff has yet been adopted, but it is probable that the rates of duty fixed upon will be satisfactory to Russian manufacturers.

The Proposed Auction Sale of Wood Screws.

In our trade report this week, under the heading "General Hardware," will be found an interesting item of news to the effect that the American Screw Company have in contemplation the experiment of a sale by auction of a large lot of wood screws, with a view to relieving themselves and the market of an accumulated stock which has become inconveniently large. The announcement is not made positively, and it seems to be evident that in authorizing its publication in *The Iron Age* the company desire to call out the views of the trade for their own information and guidance.

To discuss such a proposition editorially is at once delicate and difficult, inasmuch as nothing within our knowledge in the past history of the trade enables us to foretell the probable issue of the experiment. Selling by auction is, at best, an abnormal method of effecting exchanges between seller and buyer. In certain lines of trade it has become an established custom, for reasons which do not exist in the hardware trade, and probably never will. In the dry goods trade, for example, the auction-room is used as a means of forcing off goods when, from any cause, the demands of trade are not sufficient to consume stocks in manufacturers' or agents' hands. The dry goods trade is peculiarly a trade of seasons. Stocks manufactured for sale at a given period of the year must be disposed of promptly or carried over. They are, moreover, a class of merchandise in which consumption is largely influenced by price. If the manufacturer or agent can close out at auction a line of goods which must otherwise be carried over, he can usually afford to let them go at prices much below the market quotations, as he saves interest, storage, insurance and the risks of carrying a stock over from one season to another. The buyer, on the other hand, is encouraged to buy by the opportunity of purchasing at his own valuation a line of goods which will always sell at retail when offered cheap enough. Sometimes, when a speculative spirit is developed among buyers, the prices obtained are as good as those which the goods would have commanded at private sale, but even then they are seldom profitable to the seller.

With imported goods the case is somewhat different. Some lines of foreign manufactures are imported almost wholly for the auction room, and as the importations usually bear a close relation to the probable wants of the market, there is competition enough among buyers to keep prices up to figures which leave the importers a profit. In the case of teas, india-rubber, &c., the requirements of consumption are imperative and the available supply accurately known. When a cargo arrives it may safely be put up at auction, unless the market happens to be overstocked at the moment. In these lines the trade deals with known quantities, and the lower prices obtained in the auction room are usually compensated by quick returns.

Outside of the dry goods trade the auction business in domestic manufactures is limited in amount, and the goods sold are mostly those made for the auction room, collections from bankrupts' stocks, defective or damaged wares, &c. Sometimes they bring their value, and occasionally more, but usually they are "knocked down" cheap.

We have neither time nor space this week for an extended discussion of the subject under consideration, but from the preceding general remarks it will be seen that the success of a sale of goods by auction depends very much upon circumstances. In the case of screws the circumstances do not seem to us to favor active bidding or satisfactory prices. In the first place screws are not seasonal goods, and consumption is not likely to be stimulated by cheapness. The companies engaged in the business have an extensive plant in perfect operation, and a capacity so great that any demands of the market could be more than met at short notice. The market would not, therefore, be relieved to any beneficial extent, so far as dealers are concerned, by a forced sale of all the stock in manufacturers' hands, inasmuch as current production would suffice to maintain an over-supply. To attract buyers to an auction under such circumstances, the company would have to announce the amount of their offering and state the conditions, which would have to be the sale without reserve of all the goods put up. Buyers would probably be willing to speculate if they could get screws enough below the cost of manufacture to give assurance that the makers would be unwilling to sell any more at the same prices, but we have no idea that the American Screw Company are prepared to sacrifice their stock merely for the sake of getting rid of it.

These are, at most, hasty generalizations from data insufficient to justify a positive opinion, but the views we have expressed seem to be warranted by such information as we have. We should be glad to know the opinions of the trade with regard to the expediency of the venture. Thus enlightened, we may consider the subject further in another issue.

Condition of the Manufacturing Industries of Europe.

Recent advices from Great Britain clearly show that whatever the real or supposed advantages which British manufacturers have gained in past years from free trade—and consequent low wages to labor—their system has proved no safeguard against the paralyzing influence of general stagnation. At the present moment our manufacturers are probably better off, generally speaking, than those of Great Britain, and with much better prospects of early revival and continued development. The immense cotton industry of Lancashire is brought to a standstill by a strike of the operatives against a further reduction of wages which left them the choice between starving in idleness and starving on the meager fruits of industry. The great woolen manufacturing industries of England are also much depressed, although in some lines a slight improvement is noted. In the coal and iron trades the situation is desperate and the outlook dark. Prices of pig iron continue to decline, and no one has ventured to say when bottom would be reached. There, as here, the market is overstocked, and as makers are compelled to realize, buyers are not inclined to purchase beyond immediate requirements. A greater activity in ship-building has caused an improvement in the demand for plates. The steel business is very quiet, and the Sheffield and Birmingham industries are much depressed. The situation is thus summarized in *Iron*:

It was anticipated by a few of our correspondents last week that as prices were in the highest degree unlikely to go below those of 1864, the present near approach to those rates might be regarded as a hopeful sign. But we have now to record that in the steel and iron trades the memorable low figures of 14 years ago are once more touched, and worse seems to be expected. At the same time it must be borne in mind that low prices are chiefly connected with ordinary qualities of stuff, and that the superior qualities appear to command good prices even in the worst times. The special steel for tools and similar high-class uses are cases in point as far as Sheffield is concerned, while the first-class brands of boiler plate peculiar to West Yorkshire afford another illustration. Indeed, it is reported from this latter district that large government orders have been offered at prices based upon the present depression, but have been refused, on account of the determination to have a good price for a good article, which is unanimous among the makers. These cases are, however, exceptional, and the bulk of our reports still speak of nothing but dull trade. Quotations are coming to be quite nominal on many exchanges, and but little business is done, although prices asked and offered only differ by a few pence. Buyers will not or cannot raise their offers, and sellers dare not reduce their terms—openly, at any rate, though we hear of underselling at more than one large center. The West Coast keeps up its quotations, but prices are somewhat weaker. This district shares with Cleveland the good fortune of being able to improve its steel-making plant, so as to be ready for better times—when they come. Lancashire, like other districts, is simply doing a hand-to-mouth trade. North country irons are offered at lower prices than local brands, but little business is done in them, although the competition affects prices. Of Staffordshire much the same may be said. The finished iron trade is, as usual, a little brisker than that in pig, being confined, however, to home demands, though these are being somewhat modified by the increase of business consequent upon the crisis in the cotton trade. Hardware and ironmongery are not in very great demand, in spite of the diminution in stocks reported by travelers all over the country. Government purchasers seem to have exhausted stocks of many articles which will have to be made up again. The coal market sympathizes with the iron market, and dullness is its main characteristic.

French and Belgian advices are to the same general effect. In France it is believed that any change which may occur will be in the direction of improvement. The only activity reported is in fine irons for carriage builders' and tool makers' use. General business is dull, and nearly all the important manufacturing industries of the country are struggling against adverse conditions and low prices. Considerable benefit is expected from the Exhibition, but it will not be felt immediately. The Belgian iron industry, though suffering from the unusual depression, seems to be in a very healthy condition. It is stated that not one failure in the iron business has occurred in Belgium during the past three years. Wages have suffered a serious decline, but the workmen have accepted the situation and strikes are almost unknown. If we derive no other satisfaction from such a hasty glance at the situation than the assurance that we are no worse off than our neighbors, it is a comfortable knowledge that will better enable us to bear the ills we suffer.

Elsewhere in this issue we give abstracts of two of the valuable consular reports which have been called out by the intelligent and well-directed efforts of Mr. Everts and Mr. Seward to make our consular service immediately and practically beneficial to commerce, and especially to those who are engaged in the effort to build up our export trade. The most important of these is from Mr. J. R. Weaver, our Consul at Antwerp, Belgium. Read in connection with our editorial entitled "American Interests in the North of Europe," published March 28, and another entitled "The Commercial Development of Belgium," published May 9, it will be found to give our manufacturers a great deal of exact statistical and general information concerning that country and its markets. It will be noticed that Mr. Weaver's report exactly confirms the views we expressed in our editorial on the needs and demands of Belgian consumers. He states very clearly and correctly that not our wants but theirs must direct the efforts of the American manufacturers. Mr. Weaver also urges the importance of honesty in every detail of manufacture. The people of the Continent are tired of goods in which cheapness is secured at the expense of quality, and what they buy must be good as well as cheap. What he says about resident agents, special depots or show rooms and traveling salesmen, merits careful

consideration. In fact, Mr. Weaver's report is a model official document, and is one of the best we have had the pleasure of printing. The other abstract to which we refer is on our trade with Central and South America, by Mr. Williamson. Interesting extracts are also given from letters by Col. T. W. Knox, written from the East Indies.

The National Association of Stove Manufacturers.

The semi-annual meeting of the National Association of Stove Manufacturers is announced to be held at the Kennard House, Cleveland, Ohio, beginning Wednesday, June 19, at 11 o'clock a. m.

The peculiar state of the stove trade and the strong feeling growing out of the discussion of some questions which have a present interest for manufacturers altogether disproportionate to their economic importance, promise an unusually interesting meeting, and will probably attract a considerable attendance. Strong in numbers and in influence, the association is capable of exercising a power which, if properly directed, can be made largely and permanently beneficial to the whole trade. It is, however, no discourtesy to the management or the members to say that the interest and value of its deliberations would be very much increased if some order of business could be agreed upon in advance. The first day is usually consumed in purposeless talk, and the second day's business is often interfered with by a vast amount of discussion which has no specific object, and which commonly drifts from one subject into another. No one seems to know, when the association is called to order, what is to be done beyond calling the roll and listening to the president's address. This is commonly followed by desultory talk, motions and resolutions. The second day's session is usually much longer and more interesting than the first, but if, as at the last meeting in New York, one interesting subject is raised, it is likely to monopolize the discussion. In their social features the meetings are delightful, and these semi-annual gatherings of the trade cannot fail to be attended with great benefit to all who take part in them; but in criticizing the sessions as business meetings, we believe we express the opinions of a majority of the officers and members. Considering the present condition of trade, it is important that the association should put itself squarely on record on a great many subjects; and while it is neither our duty nor our privilege to make suggestions as to the order of business, we hope, for the sake of the great material interests represented by the association, that the gentlemen upon whom that duty devolves will appreciate the importance of giving it early and careful attention. The mistake of providing too much business is, of course, as great as that of providing none at all, but with several years' experience to guide them, the executive committee should, we think, have no difficulty in striking the happy medium between nothing and too much.

The Treasury Decision in the Case of Siemens-Martin Metal.

The following is the text of the decision of the Secretary of the Treasury respecting the classification of Siemens-Martin steel for appraisement by customs officers:

WASHINGTON, D. C., May 27, 1878.
Collector of Customs, Boston, Mass.: Sir—The Department, by decision of December 1, 1874 (Synopsis 2005), held that metal produced by what is known as the "Martin-Siemens process" should be charged with the duty imposed upon steel, such process being considered a steel-making process, designed only to produce an article having the "quality of steel." Subsequently, upon further consideration, and upon additional facts at that time submitted, the Department, by letter of July 14, 1876 (Synopsis 2891), expressed its conviction that both iron and steel are produced by the Martin-Siemens process, and that consequently the fact of manufacture by that process was not of itself conclusive ground for classifying the product as steel, but that the question whether any particular importation was iron or steel was one of fact to be determined by the appraisers.

It has recently been ascertained that a want of uniformity has prevailed at the ports of New York and Boston in the classification, since the later decision, of importations of metals produced by the Martin-Siemens process: metal of that character, and similar in every respect, having been without exception classified at the first-named port as steel and at the latter as iron.

In view of these facts the department has again had the matter under consideration, and has submitted the question of the character of this metal to experts, metallurgists and the most prominent manufacturers of and dealers in iron and steel in the United States. A careful consideration of the reports and opinions of these persons satisfies the department that the Martin-Siemens process was intended to be and is essentially a steel-making process, and that the product of such process must consequently be steel or an article possessing the general characteristics of steel, and used for the purposes to which steel is applied.

In confirmation of the correctness of this view, it may be stated that the classification at the port of New York of the metal in question as steel has been accepted without dissent by importers of that city, and that protest against payment of duty exacted on such classification has in no case been made. After a full examination and consideration of all the facts and information bearing upon the question at issue, the department is of opinion that the classification as iron of metal produced by the Martin-Siemens process is erroneous, and that all metal produced by that process should be hereafter classified as steel, and assessed with duty accordingly. The decision of the department of the 14th of July, 1876, heretofore referred to, is therefore revoked, and decision 2005 will be regarded as in full force.

Very Respectfully,
JOHN SHERMAN, Secretary.

It will be seen that this decision reverses that of July, 1876, and reaffirms that of December, 1874.

to his nation, and our approval of rebellion against tyranny makes us deplore the more the crime of the wretched man who, aiming at the Emperor, wounded not him alone but the whole German people.

Crop Prospects in the Southern Food-Producing Belt.

The wheat harvest in the Southern wheat belt, which includes the James River and Tennessee Valley, and extends westward, taking in the lower counties of Kentucky and Missouri and the northern portions of Arkansas and Texas, began at several points about May 26. All the grain in this belt will be cut by the 10th of June. The harvest shows that the late general reports about damage by fly and rust were largely exaggerated. A good deal of damage has been done the crop by the causes referred to, but, taking acre for acre, about three-fourths of an average crop will be realized. The grain, too, is of superior quality. The rust has been confined to the blade, and, as usual in that case, the heads have been shortened and the number of grains lessened, while the quality has suffered no deterioration, as would have been the case had the stock suffered from the disease. The war prospects in Europe stimulated sowing last fall, and the area on the wheat lands of this Southern belt is nearly twice as great as last year, so that part of the country is not likely to "suffer for bread." To show that the report that the Southern wheat crop was "ruined" had little or no real foundation, we have only to point to the fact that merchantable red of the crop of 1877 is quoted at Chattanooga, a market beyond outside competition at present, at 85 cents, and fancy white at 90 cents per bushel. Other growing crops in the Southern agricultural region north of the cotton and sugar belts are in a most promising condition. Corn, clover and oats were never known to look better. Every kind of fruit will be in greater abundance next autumn than ever before.

About seventy-five flat-boats arrived at Chattanooga, on "a rise" in the upper waters of the Tennessee, occurring from the 18th to the 25th of May. These craft were loaded with about 100,000 bushels of grain, mostly wheat, besides many thousand pounds of bacon, baled hay, potatoes, peas and other food products; and although the price to the producer is very low, still the fact that there is a large surplus of food being produced where only a few years ago almost all was imported from further north, speaks well for the future of that section. In 1872 the Tennessee Valley was almost entirely supplied with hay grown in Missouri and Illinois. Now enough is raised for home use—double the production in 1872—and a good deal is exported. The same might be said of meats, fruits and grains.

We refer to this condition of affairs as more especially related to the outlook for manufacturing in the South. No community can be entirely successful in manufacturing if its food supplies must be wholly or largely purchased beyond its borders. No agriculturists are so prosperous as those who find a ready home market for all they produce. The varied and abundant mineral products of the Southern hills and mountains, and the capacity of the valleys which lie between to produce food, must in time populate these mountains and valleys with busy and prosperous residents. The progress made in developing both the interests referred to in the past few years is very encouraging.

An English patentee of an improved projectile has lately involved Herr Krupp and the Mikado of Japan in an interesting law suit. It seems that the Mikado ordered from Herr Krupp some shells of a particular pattern. The order was filled and the goods were shipped via England, where they were to be transferred to some Japanese war vessels in course of construction. When they reached England the inventor obtained an injunction on their transshipment until his claim for infringement of patent was satisfied. This action so frightened the shipbuilders that they piled the shells in their yards, and Krupp and the Mikado have had to appear as joint defendants in the suit growing out of the motion to dissolve the injunction. The plea of the defendants is that the shells were made abroad and a complete delivery effected at the place of manufacture, and that, consequently, there was no infringement committed within the jurisdiction of the English court. Herr Krupp first appeared as defendant, but the application of the Mikado to be joined as a defendant was allowed by the Master of the Rolls, on his submitting to the jurisdiction of the court and putting up £100 as security for costs in the suit. The point of law involved is one of much interest.

An intelligent and enterprising manufacturer of standard goods, in a private letter to the Editor announcing his intended departure for Europe, says: "My trip is in 'great part for business purposes, and I 'hope while over there to learn from English and Continental manufacturers much 'of what they have to teach in the manufacture of ——. Our countrymen are rather 'prone to think that we have nothing to 'learn in this department. Possibly we are 'right in this particular instance, but as the 'rule the belief is incorrect, and I am quite 'prepared to find that the rule holds good 'even in this case. At least we must be 'willing to learn all we can if we are to

"compete with them in their own markets. Many of us, I think, make the mistake of believing that our own ways are the best ways and must find popular acceptance everywhere. A persistence in this delusion will simply result in many cases in excluding from foreign markets the goods of the manufacturers who adhere to it. The key to success in the foreign trade, as I understand it, is to study the requirements of the market you seek to fill, and then endeavor to meet those requirements more perfectly than is done by the manufacturers who already occupy that market." This is sound, practical sense, and we are glad to see that so many of our manufacturers are taking this broad and correct view of the situation. It is sheer folly to suppose that we can force upon foreign consumers anything they do not want. There are usually good reasons for the differences which exist in the habits of two nations, and the reasons must be studied in the case of a people whose wants we propose to supply. The best preparation a manufacturer can have for a successful venture in the exporting line, is a journey over as much of the world as he can spare time to visit.

The returning prosperity of the railroad companies, resulting from large crops and an increase in the volume of internal trade, cannot fail to favorably affect other interests in a marked degree. During the past few years the companies have been compelled to exercise a close economy of expenditure, and are now in a condition to require liberal supplies of materials for repairs and equipment. We cannot expect any sudden revival from this cause, but the prospects of an improvement in general trade are made brighter thereby. It is probable that for some years to come the management of our railways will be characterized by a judicious conservatism. We shall have less of reckless extension and greedy absorption, and companies with paying lines will be much less ready to saddle themselves with burdensome responsibilities for the sake of a remote future advantage. As the result the companies will be in a better position to consume the products of our great national industries, and their increasing orders are already having a good effect upon trade.

It is stated on what seems to be as good authority as we usually have for foreign news, that the German government has promulgated a secret but general order requiring that all materials consumed in government establishments shall be of German production, including, of course, steel, iron, tools, files, machinery, fuel, &c. We question the wisdom of such an order, but if it has been issued we see no reason why it should be kept secret. The principle of consuming domestic products for government uses is a good one, but when made an absolute requirement it may at times place the government at a disadvantage.

Those who are foolish enough to hope for war between England and Russia are likely to be disappointed. The outlook grows more and more pacific, and there is little reason to fear an unsatisfactory issue of the deliberations of the international Congress. War cannot be anything but a terrible calamity, entailing far-reaching and incalculable evils, and we heartily congratulate the English people upon the prospects of escaping a struggle in which success would be scarcely less deplorable in its consequences than failure.

New Publications.

THE COAL TRADE, 1878. By Frederick E. Seward, Editor of the *Coal Trade Journal*. Price, \$1.

The work before us is the fifth annual review of the coal trade, published by the able editor of the *Coal Trade Journal*. It is chiefly a compilation of data concerning the production of the various countries of the globe and of the various coal districts of the United States and Canada, the figures in many cases covering a long period of years. They are particularly valuable in the case of the various anthracite and bituminous coal regions of Pennsylvania, which State naturally occupies the greatest share of the author's attention. Brief historical and descriptive notes, aided in many cases by maps, enable the reader to form an approximate estimate of the extent of the various coal fields, their position to highways of travel and to the great markets. As far as possible the author illustrates the nature of the material mined by analyses. Another feature deserving the careful attention of those who consult Mr. Seward's work are the receipts and shipments of some of the principal markets of the United States, for instance, Buffalo, San Francisco, New Orleans, Providence, Boston, Cincinnati, Chicago, St. Louis, &c.

The coal deposits of a number of States—of Colorado, Indiana, West Virginia, Missouri, Ohio, Tennessee, &c., are described and discussed in a series of short papers which, as summaries, are excellent and cannot fail to meet with appreciation. We cheerfully recommend Mr. Seward's book to the large circle of our readers who require a reliable work of reference.

The National Association of Stove Manufacturers.

BUFFALO, June 1, 1878.
The semi-annual meeting of this association will be held in Cleveland, Ohio, on Wednesday morning, June 19, at 11 o'clock. The Kennard House has been selected as headquarters for the association. The rates are as follows:
Rooms in second story, \$3 a day. Above that \$2 and \$2.50, according to location. This is a reduction from current rates.
Respectfully,
SHERMAN S. JEWETT, President.

THE WOOD TARIFF BILL.

Its Defeat Yesterday.

WASHINGTON, June 5.

Mr. Wood's labors in behalf of his Tariff Bill were brought to a sudden close to-day. The enacting clause was stricken out of the bill by a vote of 134 to 120. This killed the bill.

Large Iron Contracts.

The most important contract in the iron business for several months has just been closed between the New York Elevated Railway Company and two manufacturing firms for the construction of three miles of double-track railway, to which some reference was made last week in our Philadelphia correspondence. This particular job calls for 7000 tons of iron, and is given to Mr. A. R. Whitney, late A. R. Whitney & Bro., and to the Passaic Rolling Mills. This will complete the route between Sixty-first street and One Hundred and Twenty-ninth street, or Harlem River. The work is equally divided, Mr. Whitney taking the upper section, and the Passaic Rolling Mills the lower section. The competition is understood to have been quite sharp.

The proposed depot building for the New York Elevated Railway, for which Mr. Whitney has also secured the contract, will be an immense structure, entirely of iron and covering the area bounded by Ninety-eighth and Ninety-ninth streets, Third and Fourth avenues, which is equivalent to two entire ordinary city blocks. The plan of construction has not yet been finished, but it is determined to run the cars out and in over iron columns at the same elevation as the track. There will be at least 1000 feet of track within the building to facilitate the handling of rolling stock.

Mr. Whitney has just taken the contract to build the roof for the Seventh Regiment drill room, now in progress on Sixty-seventh and sixty-eighth streets, Lexington and Fourth avenues. This room will permit the evolutions of a large body of troops, the entire span being 300 by 200 feet in the clear. This large unbroken floor space has rarely been exceeded or equaled save in depot buildings. Of the two plans submitted for examination, one was a pin-connection and the other was riveted. The latter was finally adopted. The style of construction will correspond almost exactly with the roof of the Grand Central Depot, put up by the same builders. Mr. Whitney employs about 1000 men and turns out 100 tons of finished work per day.

Consular Reports.—American Trade with Belgium.

Mr. James R. Weaver, United States Consul at Antwerp, communicates the following to the Department of State under date of May 1, 1878:

On account of the great facilities afforded by the various direct steamship lines, which for several years have been plying regularly between this port and the United States, Antwerp and the surrounding country, as well as the entire kingdom of Belgium, have become so familiarized with our American products, and to such a considerable extent with our manufactures, that at first view it appeared doubtful if any very great development in these imports, especially of the products of our country, could be profitably made. Consequently the frequent response made to my inquiries in reference thereto by the most intelligent and enterprising merchants of this city, was to the effect that the people of the United States are doing wonderfully well in their export trade to Antwerp, and that they could hardly expect to augment their shipments to this port to any considerable degree. And when it is stated that the general imports from the United States to this port amount annually to over 125,000,000 francs value, or to over 11 per cent. of the total imports, the justness of the above expression of opinion becomes more apparent. It may be further stated that the commercial intercourse of the United States with Antwerp is second in importance to only one of all the nations of the world. And could the origin of the imports from England to Antwerp be accurately ascertained, there is no doubt but that the percentage of our trade would be largely increased and found to be relatively in the most flourishing condition of all the great commercial nations trading with this port.

From the several recent annual commercial reports forwarded to the department from this consulate, it may be observed that with but few exceptions the chief productions of the United States stand prominently among the imports of this port. Having overcome every prejudice, and being now in the hands of substantial parties, they have created such a demand and reputation for themselves that a permanent position is without doubt secured for the future. Certain articles have become a necessity to the prosperity and well-being of the people of this country, while a failure in the supply of such articles as petroleum, wheat, meat, cotton and tobacco would revolutionize prices. Among these principal articles of the production of the United States, imported in such large quantities and known so favorably upon this market, may be mentioned the following: Wheat, flour, petroleum, oils, resin, turpentine, salt, pork, bacon, hams, lard, tallow, tobacco, dyewoods, copper, drugs, honey, minerals and clays, canned fruits, fish, meats and vegetables, cotton, lumber, and recently, fresh oysters. I should observe that each of the foregoing articles is well introduced upon this market, and in order to sustain them in good position it will only be necessary for our shippers to be careful in respect to the quality of the articles shipped, the manner of packing, and the parties to whom they consign; for each and every *mauvais entendu* between the parties interested works harm and excites a prejudice against the trade. Besides, the distance is so great, the time required to rectify mistakes or settle disputes so considerable, and recourse to law so difficult and expensive, that the utmost care should

be given to all minutiae, and every precaution taken to place first-class articles in first-class condition in the hands of capable, honest and honorable parties, to the end that every dissatisfaction as far as possible may be avoided. It should be remarked, however, that with a little enterprise on the part of shipowners, merchants and capitalists, and the co-operation of the authorities and commercial houses of the several ports interested, the direct importation of many of the articles mentioned above might be materially increased; for example, the quantity of cotton imported directly from the United States to Antwerp, instead of increasing, as it should, is constantly decreasing. The principal cause of this is the absence of direct steam communication to the cotton ports. Frequent projects have been considered recently to establish such a line, but as yet no success has attended these efforts. Another reason for the decline of the cotton trade at this port is undoubtedly the abuse which the direct shipments received during the Franco-German war, when, partly through unavoidable circumstances and partly through the culpable neglect of consignees or other agents, thousands of bales lay exposed for months, unprotected from the elements and petty thieves, until the loss was frightful. The mistake was realized when too late, but if direct steam communication could be established with one of the principal Southern ports, there is great reason to believe that it would enormously increase the shipment of cotton and other products of those States to this port. Could such a line be guaranteed actual expenses by any railroad or combination of them, there are plenty of houses in this city willing to undertake its establishment.

The lumber trade likewise might be increased profitably if certain abuses could be removed and port regulations modified. The great complaint is the delay attending the discharge of cargoes in this port. The expense and delays at present conducted eat up what might be otherwise a living freight. But as these delays and expenses are brought about by lack of means to handle such cargoes, as well as the deep rooted habits and customs of people and the port, no serious improvement can be hoped for very soon. No attempt as yet has been made to import to Antwerp fresh meat, butter and eggs, but the prices of these articles on this market would apparently warrant an experiment to be made in that direction. The Red Star Line is now employed in constructing two additional vessels for what must be eventually a weekly service. This line and the White Cross have during the past season imported each voyage from one to three hundred barrels of oysters to Antwerp, which gave general satisfaction, although some objections were expressed in reference to their taste and appearance, and a portion of several lots was condemned as unfit for use by inspectors appointed for the purpose. It is believed, however, that upon further acquaintance they will improve and overcome prejudices, as several other American products have heretofore done. The small quantity of Indian corn imported to this country is surprising. Neither man, animal nor fowl appears to appreciate it as an article of food. If some means could be suggested to teach the Continent how to prepare this healthful and excellent article of food, the consumption would be without limit.

But while the productions of the United States, comprising principally the raw materials, hold such prominent positions in the importations of this port, our manufactures are imported in very limited quantities. For several years the importations of leather have averaged about 5,000,000 francs annually, but this is about the only manufactured article imported in considerable quantities, a large part of which arrives in transit for the interior of the Continent. But several other articles are found in small quantities upon the market, the result of many efforts put forth during the last decade or two. But all such efforts have been made in only a half-hearted way, without inspiring confidence or doing the article justice. Recently greater energy and tact have been displayed, and it is to be very earnestly hoped that this business may finally drift into the hands of solid, reliable parties. The people of the United States enjoy certainly a very enviable reputation for ingenuity and invention, particularly in reference to the construction of practical, useful machinery. Consequently, we find among the importations to the United States to Antwerp, American pumps, sewing machines, fire-engines, agricultural machinery, household utensils, garden tools of all descriptions, mechanical toys, &c. There may be seen also stoves, safes, locks, general hardware and cutlery. We find, in small quantities, plain glassware, cotton fabrics, and wooden manufactured articles, as well as various ingenious contrivances of a well-regulated household, from the rolling pin and smoothing-iron to an elaborate sewing machine and musical instrument, all fair specimens of our industrial and mechanical skill.

In addition to the foregoing articles I might enumerate several others that as yet are not upon this market, but that might be profitably introduced with a little effort and judgment, viz., machine-made horse shoes and nails, school furniture, carriages or parts thereof, such as hubs, spokes, felloes, &c.; machine-made splints, gutta-percha harness mountings, wooden boot-trees, shoe lasts and certain qualities of patent leather; also, possibly, train cars and railroad carriages. Should we, therefore, classify the foregoing articles into three categories, and embrace others more in detail, we have as follows:

Class I.—Products and manufactures of the United States at present generally introduced upon this market and favorably received, but not likely to be greatly developed, comprising wheat, flour, petroleum, resin, turpentine, bacon, hams, lard, tallow, tobacco, drugs, copper, minerals, clays, canned fruits, corn, fish, meats and vegetables, dyewoods, leather, pumps, sewing machines and electrolytic silver-plated ware.

Class II.—Products and manufactures partially introduced but susceptible of considerable development through energy and good judgment, comprising cotton, corn, lumber, oysters, tan-bark, walnut, oak, cherry, ash and hickory woods for cabinet-

making and other purposes, glues, stoves, oilstones, lamps, safes, scales, garden tools and agricultural machines, especially reapers, horse-rakes, plows, lawn-mowers, &c., household and kitchen utensils, brooms, smoothing-irons, wash-boards and washing machines, wringers, cottage furniture, cabinet organs, meat, bread and sausage-cutters, ice-cream freezers, porcelain-headed nails, scroll saws and fancy woods, door-locks, padlocks and window fasteners, muslins, hardware and cutlery, skates, slates and pencils, plain glassware, children's toys, particularly those worked by machinery, wooden utensils, wooden handles and shoe-pegs.

Class III.—Products and manufactures which are unknown upon this market but which might be introduced by proper efforts, among which may be mentioned fresh meat, poultry, butter, eggs, dried peaches and apples, anthracite coal, school furniture, carriage and wagon hubs, spokes, felloes and frames, machine-made nails, horse shoes and nails, match-splints, harness mountings, boot-trees and shoe-lasts, imitation morocco and other leathers, tin and japanned wares, and possibly tram cars and railroad carriages.

In attempting to develop the importance of the articles mentioned in the second category or introduce those of the third, there are several important prerequisites that should be carefully considered, viz.:

1. The style of all manufactured articles intended for this market must conform as nearly as possible to those to which the people of this country have been accustomed. It is all very well to insist that the American styles are superior to those in demand here; but tastes and customs are so deeply rooted in the heads and every-day life of the Flemish, that it will be found to the advantage of manufacturers to accommodate themselves to them, rather than try to change them. Consequently stoves should be constructed with small grates, in order to consume the least fuel possible. Fuel is expensive here, and it is not customary to bake and wash in the same household, so there is no necessity to have such large capacity in the grates and ovens. The Belgian pavements being very rough require strong solid carriage frames and wheels, hence the quiver of the light American carriage proves very objectionable to the Belgians. Likewise in almost every article there is some modification required to suit the customs of the people, or the exigencies of the trade. Consequently, whenever possible, manufacturers or exporters should visit the country and study on the spot the requirements of purchasers in detail.

2. The articles must be brought to the attention of the people, and in a manner to attract them and inspire confidence. This is undoubtedly an essential requisite to success. As long as the introduction of an article is uncertain, or if it requires considerable personal energy to push it, first-class houses will hardly touch it. Also while extensive purchasers may wish to avoid middlemen, it will in all probability be found necessary to give a monopoly of an article into the hands of one party in order to secure their services; and hence arises the difficult question of selecting reliable and capable agents. But if the home firms could establish branch houses in one or more central cities of Belgium, say Antwerp or Brussels, and send out from these reliable commercial agents, who could properly represent their wares and explain their excellences, one great object would be gained; confidence would be inspired by the very fact that a central depot was established on Belgian soil which would guarantee purchasers against fraud and misrepresentation. If foreigners must be employed, as will probably be the case, they ought to be selected from personal knowledge and acquaintance. Sometimes it has been found practicable for an intelligent agent or part owner thoroughly conversant with the business, to canvass the country and solicit orders, but in such cases the terms must be very easy, and the danger of loss consequently greater.

3. The establishment of show rooms on the co-operative system has been suggested for several months to those unable or unwilling to undergo the expense of establishing a special depot for themselves. Parties in Antwerp have agreed to my suggestion to undergo the expense of hiring rooms to expose such samples as might be intrusted to them, but as there can be no guarantee that the article will prove remunerative, such parties have usually required that all samples shall be sent free of expense; that if sold a certain fixed commission will be charged, and if not the articles will be returned to the owners or disposed of at their expense, risk and peril. As yet there has been little or no response to such overtures. At first view I was inclined to regard the idea of show rooms very favorably, but upon further deliberation I question very seriously if one agent could give much satisfaction to so many various interested parties. While perhaps a fine theory it would probably fail in practice, in that the various articles would not receive the proper amount of special attention and push necessary to place them before the people.

4. Should it be thought impracticable to establish branch houses at Antwerp, to secure reliable agents to push a specialty or to take the risks of the co-operative depot or exposition rooms, I have to suggest that in the absence of samples something might be done by the liberal use of illustrated catalogues and circulars.

5. The strongest appeal to a Belgian is that of economy. The prices of foreign articles must be lower than those paid for home manufactures. The superiority of material, finish and utility will not go far. The Flemish reckon by centimes. Consequently the greatest barrier to the successful introduction of our manufactures is the price. One is met on all hands with this observation, "The American articles are splendid, but the prices are too high; we cannot sell them at that figure." Some agents have advised the employment of cheaper material. The solid brass door locks are magnificent, but they cost three times as much as the Belgian and German iron locks. Consequently only the poorest and cheapest quality of most articles can at present be sold. To meet this difficulty present sacrifices must be made to gain the

market and introduce superior first-quality articles. Besides, the Belgian manufacturers are perfectly aware of the danger of a vigorous competition that threatens what was heretofore their monopoly, and they are prepared to reduce their prices to a minimum. In hand-made work the Flemish artisans will probably surpass those of the United States, but in manufactures made by machinery the latter manifest the greatest aptitude and turn off the finest articles; with these our people must eventually succeed.

6. Attention to details must not be forgotten. Every precaution against misrepresentation or sharp practice on the part of agents must be taken. As far as possible errors must be promptly corrected and difficulties amicably arranged. The packing should be done in the most careful and substantial manner, in order to obviate breakage and the delays and inconvenience caused by a missing screw of a piece of machinery. These precautions, supplemented by a judicious personal oversight, energy and determination, will make the American importer a formidable competitor in this market, and secure for his wares a most hearty welcome from the masses of the Belgian people. It should be remarked that while raw materials, agricultural products and articles of food are generally admitted free of duty in this country, as a general thing manufactured articles pay a duty of 10 per cent. ad valorem.

Before closing my despatch I should add that the exports from Belgium to the United States are relatively very small. For 1876 the general exportations to the United States amounted to 23,000,000 francs value, while the special exports, or those of Belgian origin, amounted to only 11,000,000, whereas the special imports from the United States to this country for the same year amounted to 110,000,000, or tenfold as great. The chief products and manufactures sent from this country to the United States are glass, beet-root, sugar, cast and scrap iron, steel, fire-arms, rags, clothing, paper, drugs, chemicals, manufactures of wood and machinery. Several of the foregoing articles, which have been heretofore regarded as specialties of Belgian manufacture and exportation, have been decreasing recently in a very extraordinary manner. During the last five years the exports of iron have fallen off from 3,000,000 to 30,000 francs, paper from 1,000,000 to 25,000, zinc from 2,000,000 to 182,000, and lead from 2,000,000 to 85,000 francs. This decline, brought about by a strong foreign competition, causes great concern to the Belgian manufacturers. They freely acknowledge that they have lost the American markets, and must seek outlets for their surplus manufactures in new fields as yet unexplored. Especial attention is now being directed to China, Japan, and the interior of Africa when eventually explored and opened up to trade.

A comparison has been recently made between the imports and exports of Belgium for the years 1856 and 1876, where it was shown that while the manufactured articles imported for these two years amounted to 19 per cent. and 22 per cent. respectively, on the contrary the exportation of these articles for the same periods manifest a falling off from 56 per cent. to 43 per cent. of the totals, being a relative loss of eight per cent. Furthermore, that while the increase in the exports of raw materials during the 20 years was three and one-half fold, the increase of the manufactures was only two and one-half fold, or in other words, the manufacturing and industrial interests of Belgium have not kept pace with her commercial progress and development. The industries and manufactures of this country are at present greatly depressed. At no period since the crisis of 1873 has there been such general complaint. Many manufacturers are holding on for the present at considerable losses, in hope for a recuperation soon. Others, unable longer to endure the strain, are going into liquidation and closing their establishments. From all parts of the country are heard loud calls upon the government, praying that some relief may be granted; suggestions and propositions are made in the hope that some way may be found to alleviate the depressed condition of affairs by opening up an increased export trade. Among the suggestions proffered stand prominently the following: The government is called upon to aid and assist in the establishment of subsidized transatlantic steamship lines; in the creation and support of national commercial houses in foreign countries, and national museums or permanent expositions of Belgian manufactures in foreign centers of trade; in granting purses or sums of money for the purpose of helping meritorious young merchants to travel, emigrate to, and establish themselves in foreign countries, and, finally, to augment the number of salaried consuls; and in order to stimulate these and render them more efficient, they therefore propose an increased remuneration and frequent inspections for the purpose of ascertaining the exactitude of the information furnished, and likewise their competence, character and general transactions. If, therefore, instead of shifting the burden from their own shoulders to those of the Government and its commercial agents, and demanding so much patronage and support, the merchants and manufacturers of this country would manifest on their own behalf a little more energy and initiative spirit, and practice an economy commensurate with the demand of the present crisis, the general results would doubtless be more satisfactory and the development of trade greatly superior; for while on general principles governments may foster and encourage home trade, they could scarcely attempt monopolies of foreign trade or competition one with the other.

A floating bee-house has been constructed by Mr. Perrine, a Chicago honey dealer, large enough to accommodate 2000 hives, which he is having towed up the Mississippi River from Louisiana to Minnesota, keeping pace with the blossoming of the flowers, and thus stimulating the honey-making ability of his bees. Returning he will stop about two months somewhere above St. Louis, and will reach Louisiana in October. He wants to take advantage of the autumnal flowers at each point just as he does of the spring flowers up the river. The plan of moving bees to get the benefit of fresh flowers has been tried in a small way in some parts of Europe.

AMERICAN SCREW CO.,

Providence, R. I.,

**MANUFACTURERS OF MORE THAN 4000 VARIETIES OF PRODUCT,
AND INCREASING THE ASSORTMENT DAILY.**

Machinery employed contains important inventions recently patented, and which are designed to produce Screws at a **lower cost to the consumer** than has ever been attained.

All goods are distributed through the Hardware trade, to whom a liberal discount will be allowed.

INTERNATIONAL EXHIBITION. PHILADELPHIA, 1876.

(No. 235.)

The United States Centennial Commission has examined the report of the Judges, and accepted the following reasons, and decreed an award in conformity therewith.

PHILADELPHIA, November 8, 1876.

REPORT ON AWARDS.

Product: Iron, Brass and Steel Screws, Tire and Stove Bolts, Rivets.

Name and address of Exhibitor: American Screw Company, Providence, R. I.

The undersigned having examined the product herein described, respectfully recommends the same to the United States Centennial Commission for Award, for the following reasons, viz: **Being of a quality nearly approaching perfection, showing the highest attainment in this branch of manufacture.**

G. L. REED, Signature of the Judge.

Approval of Group Judges.

Daniel Steinmetz,
Jas. Bain,
Chas. Staples,

G. L. Reed,
J. D. Imboden,

J. Diefenbach,
Dav. McHardy.

A true copy of the record. FRANCIS A. WALKER, Chief of the Bureau of Awards.
Given by authority of the United States Centennial Commission.

[L.S.] J. L. CAMPBELL, Secretary.

A. T. GOSHORN, Director-General.
J. R. HAWLEY, President.



After forty years' experience we offer to the trade our Centennial Screws, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at the same price as the old style screw.

The new screws will be packed in manila colored boxes with the new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade-mark, which is also secured to us.

The accompanying engravings show the progress of making screw from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all

1776.



1846.

Patented August 30.



Section at Line A B

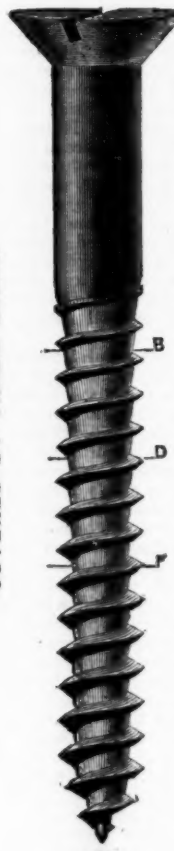
Section at Line C D

Section at Line E F

1876.

Patented May 30.

COVERED BY TRADE MARK.



Section at Line A B

Section at Line C D

Section at Line E F

Estimated to be FIFTY PER CENT. stronger than a Screw as Commonly made.

the strains of forcing the screw into the wood naturally concentrate.

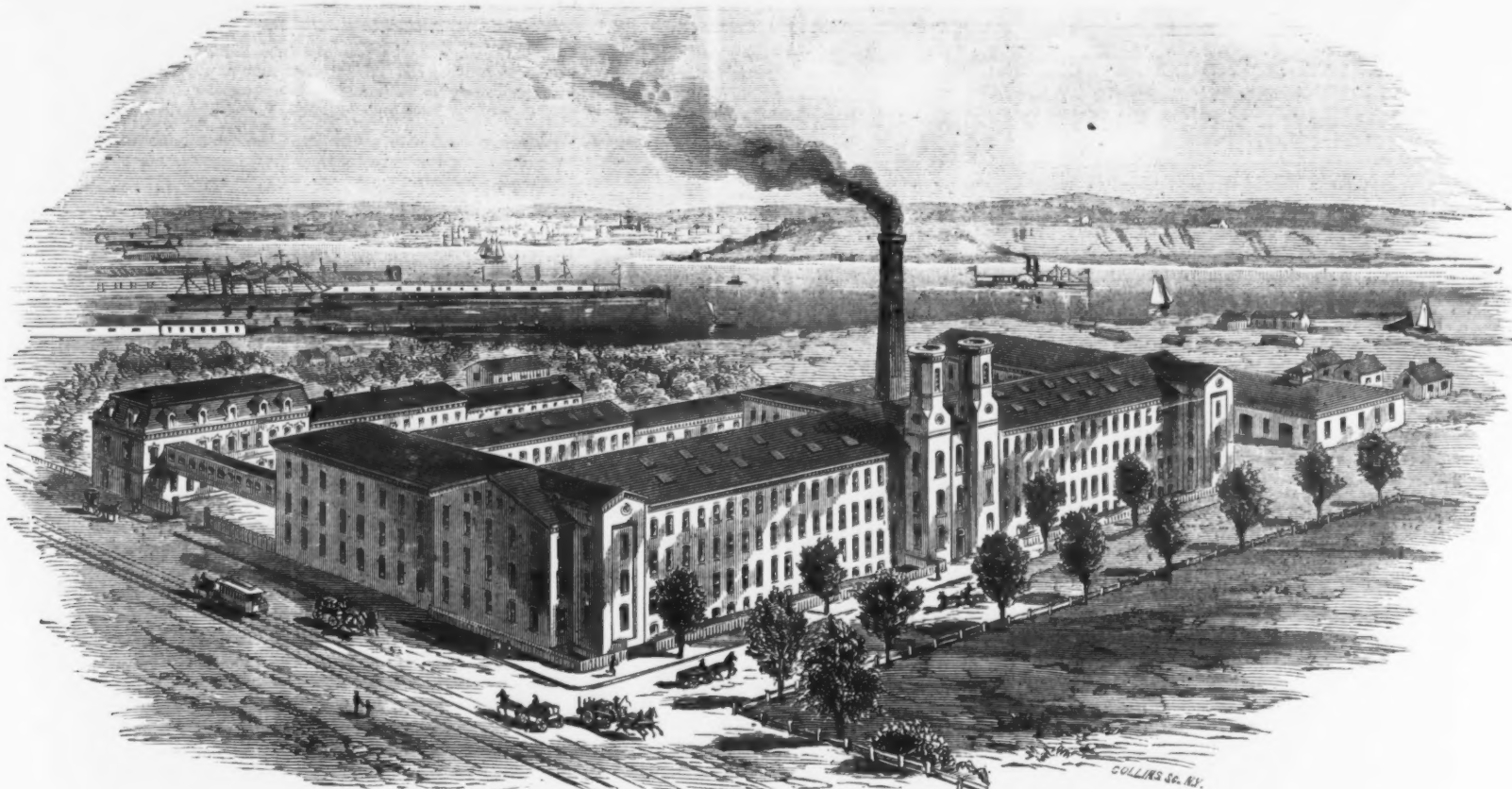
To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated. See sections at lines.

CLAIM.

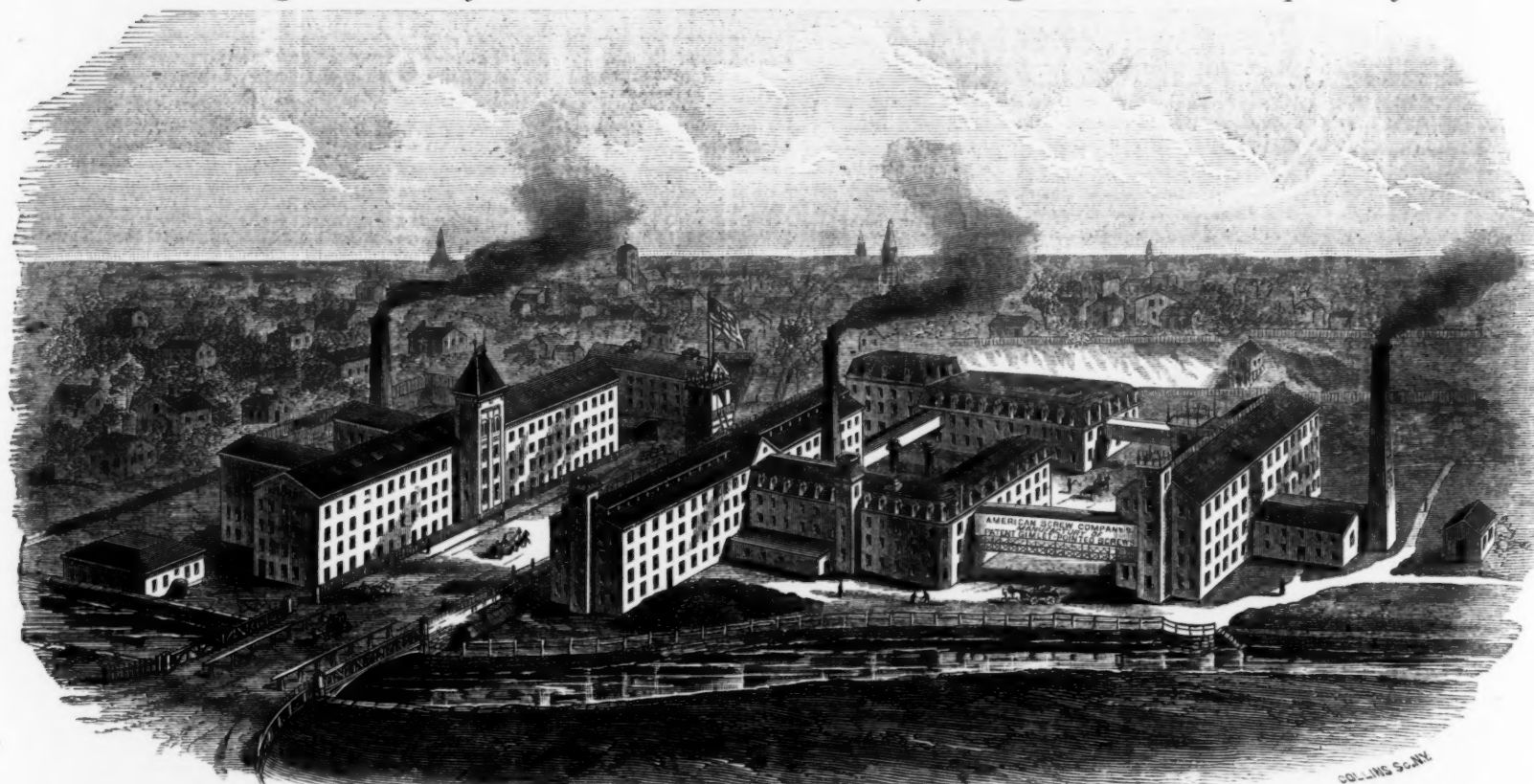
"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

On the opposite page will be found illustrations of the various Works of the company.



NEW ENGLAND MILL.

Containing Machinery for the Production of 22,500 gross of Screws per day.



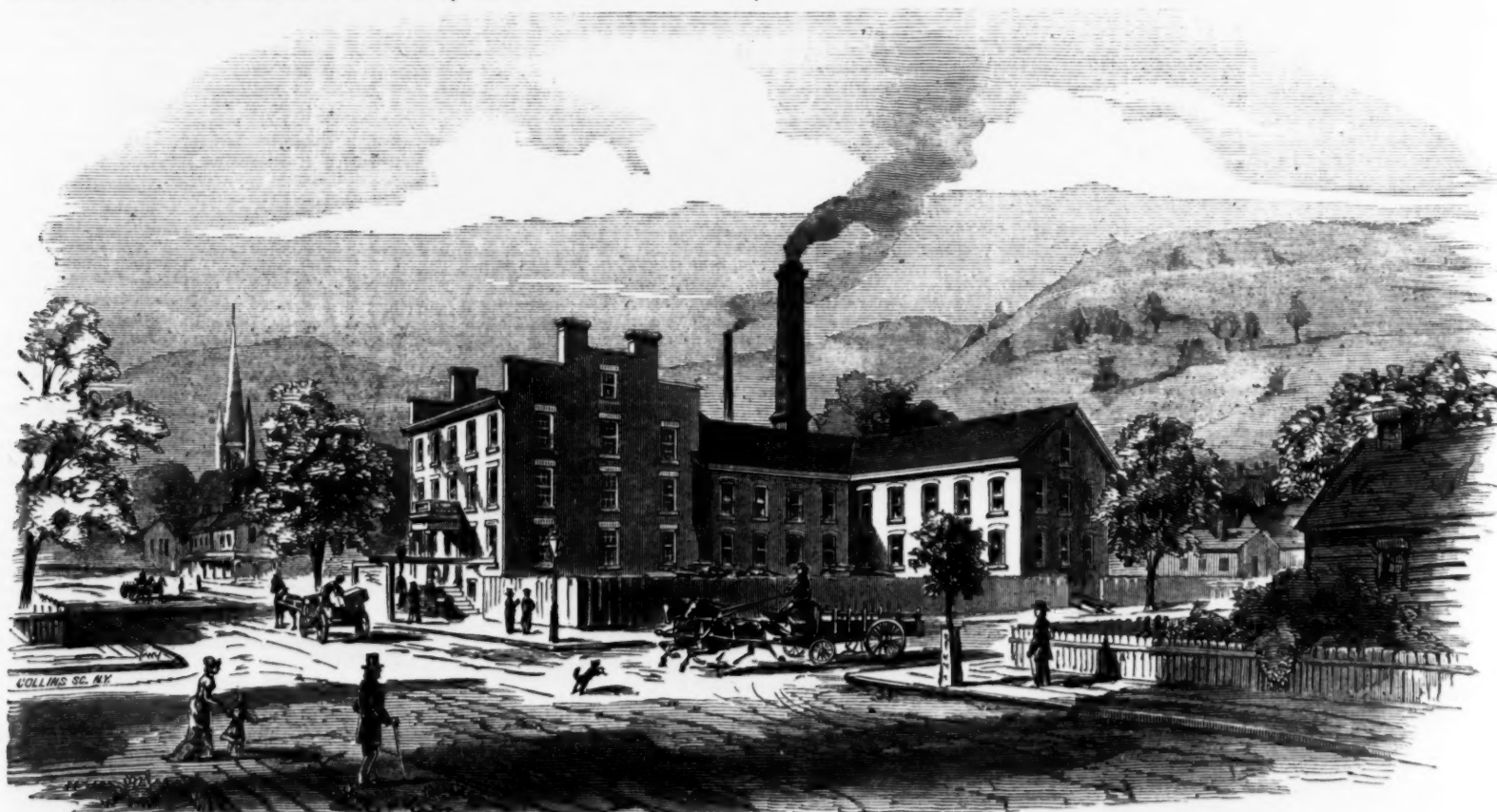
BAY STATE AND EAGLE MILLS.

BAY STATE MILL.

For the Production of Stove Bolts, Tire Bolts, Rivets,
Lock and Machine Screws, &c.

EAGLE MILLS.

Capacity 22,500 gross Wood Screws per day.



WORKS AT DUNDAS, ONTARIO, CANADA.

Capacity, 4000 gross Screws per day.

American manufacturers, and the 'beating creation' theory of our transatlantic relations. It would be idle to deny that in this respect, rapidity of production, as well as in the price in some classes of goods, our American brethren have equaled if not surpassed us. It would be just as idle again to take on faith that has been said respecting America driving us out of all markets which we have thereto considered almost as our exclusive property. That if American manufacturers as a body possess some advantages over English manufacturers we are prepared to admit. These advantages may be briefly stated as greater intelligence, more inventive power, more enterprising, and last, but chief of all, they travel extensively. This latter fact accounts to a considerable extent for the two former. A large number of the American manufacturers accept it all in the way of business to take a European tour, or a trip to the Antipodes, with a half-business, half-tourist motive; and as for Canada, the Dominion is deluged with representatives and principals cultivating business there. This enables them to see the necessities of the people they travel among, and to adapt their goods accordingly. The Americans are less home-loving than we are, and this counts for their wandering disposition. John Bull likes his fireside and the faces round there and his country too well to roam there and become an inveterate roamer. Nevertheless, if our wholesale firms and manufacturers wish to keep abreast of America and other producers, they must travel more, and plant themselves in close proximity to buyers. Valuable experience is gained by traveling which cannot be gained in any other way; and modern and future success to a large extent depends upon these remarks are written in a general sense, but apply with equal force to the hardware trades as well as to many others."

The Brooklyn Bridge Superstructure.

There are murmurings of dissatisfaction among the steel manufacturers on account of a recent decision of the Bridge Commissioners unfavorable to their interests. They affirm that the specifications call for both steel and iron, but that in advertising for proposals for materials to be used in the superstructure—i. e., the entire mass of iron-work to be suspended from the cables—the steel manufacturers are not invited to share in the competition. The company, as will be seen below, want 5800 tons of iron, and it is alleged by parties interested that steel can be furnished which would secure for the superstructure a strength at least equal to that of iron, and at the same time reduce the weight of metal employed about one-half, with but a trifling increase of cost—nothing to be compared with the advantage of relieving the cables from a heavy strain. In other words, by adopting steel the strength of the bridge superstructure might be increased 50 per cent. without adding to the weight contemplated in the original design. The point thus made possible of attainment, they argue, is invaluable, since the question of running locomotives over the bridge, or adopting an endless chain and stationary engine as finally resolved upon, was controlled solely by considerations of weight. In building the St. Louis bridge the preference for steel was so positive that \$15,000 was paid for the right to manufacture "chrome steel" to the extent desired, though it is intimated in other quarters that the quantity of steel actually used in that structure was comparatively small. Notwithstanding the evidence in their favor, the advocates of steel assert that when the specifications came before the bridge trustees they were referred to a special committee, who reported that "a part of the committee waive their opinion in favor of steel solely on the direct and explicit assertion of their chief engineer, Mr. Roebling, that to make the proposed change would materially delay the completion of the bridge," &c.

Observing that opinions were widely diverse, giving rise to much heated discussion, our reporter found opportunity to converse with Engineers Payne and Martin, of the Bridge Company, with reference to the alleged grievances. The latter stated in substance that the forms of steel required by them, such as channel bars, I beams, H beams, angle iron, &c., had never been made in this country; that it would be necessary to get up new rolls and other appliances of steel manufacture, and the company was not inclined to take the initiative, in making experiments where such large interests were at stake.

Engineer Payne was much more explicit, having given the subject earnest consideration. He had visited in person all the principal rolling mills in the country almost without exception, and had been not only surprised but disappointed in finding that not one of them had successfully made steel channel bars of the forms and sizes required. If he had found parties equipped with the necessary plant they certainly would have had a chance. Besides channel bars, of which the superstructure is mainly composed, there were two kinds of suspenders, part of steel wire rope and the remainder of solid steel rods. He could not have said, "You can have the working of all this if you will get your plant ready," because it was necessary to put out the entire work to bidders in competition. Two or more concerns signified their readiness to procure the needed plant at whatever cost, their idea being at the same time to make provisions for the future manufacture of steel plates for shipbuilding purposes, none of which are now made in the United States. They only wished to be assured that after having made an expenditure of perhaps \$200,000 in providing rolls and appurtenances they would have the contract, but under the circumstances no pledge could be given. Mr. Payne, in justification of the course which had been pursued with reference to inviting proposals, called attention to the report of the special committee to the bridge trustees, stating that it would not be advisable to resort to a structure of steel alone, or of steel and iron. The chief engineer, as quoted by them, says: "It is not practicable to obtain steel of the form and value required without a lapse of time, involving great delay in the completion of the bridge, a possible disappointment at last and a large increase of cost to meet the construction of rolls, &c., adapted to the form of materials required." So far from being prejudiced against the use of steel, Mr. Payne acknowledged having a decided preference for this material, so far as he was personally concerned, though he had studiously refrained from betraying any bias whatever, or committing himself to any controversy—choosing rather to be governed by facts on their merits. He predicts, however, that before two years have passed we shall have in this country establishments for rolling steel equal to every requirement; that the stimulus now imparted by the demands of the East River Bridge Company will be attended with effect, corresponding to those which followed when they demanded steel wire, a material which at first could not be made of a suitable quality on this side of the Atlantic, but which now is produced here in perfection. As regards steel suspender rods, the remark was dropped *sub rosa* in the engineers' office that one or more well-known American steel companies were making excellent goods, too fine, in fact, for their purposes, and better suited to choice cutlery. This fine steel lacked elasticity, yielding only in the smallest degree to the severe tests applied, and ranking high for certain special uses, but not suited to the requirements of the bridge.

In the foregoing we have endeavored to present impartially some of the facts which have arisen in private discussions relating to the recent actions of the bridge commissioners, and shall indulge a hope that a new stimulus will be imparted to the great and growing industry represented by the steel manufacturers of the United States.

The following is a description of the superstructure of the bridge as detailed in the specifications:

The main span has a length of 1595 feet 6 inches from center to center of towers. Each land span has a length of 930 feet from

Established 1838.

THE HART, BLIVEN & MEAD MFG. CO.,

MANUFACTURERS OF

GENERAL HARDWARE.

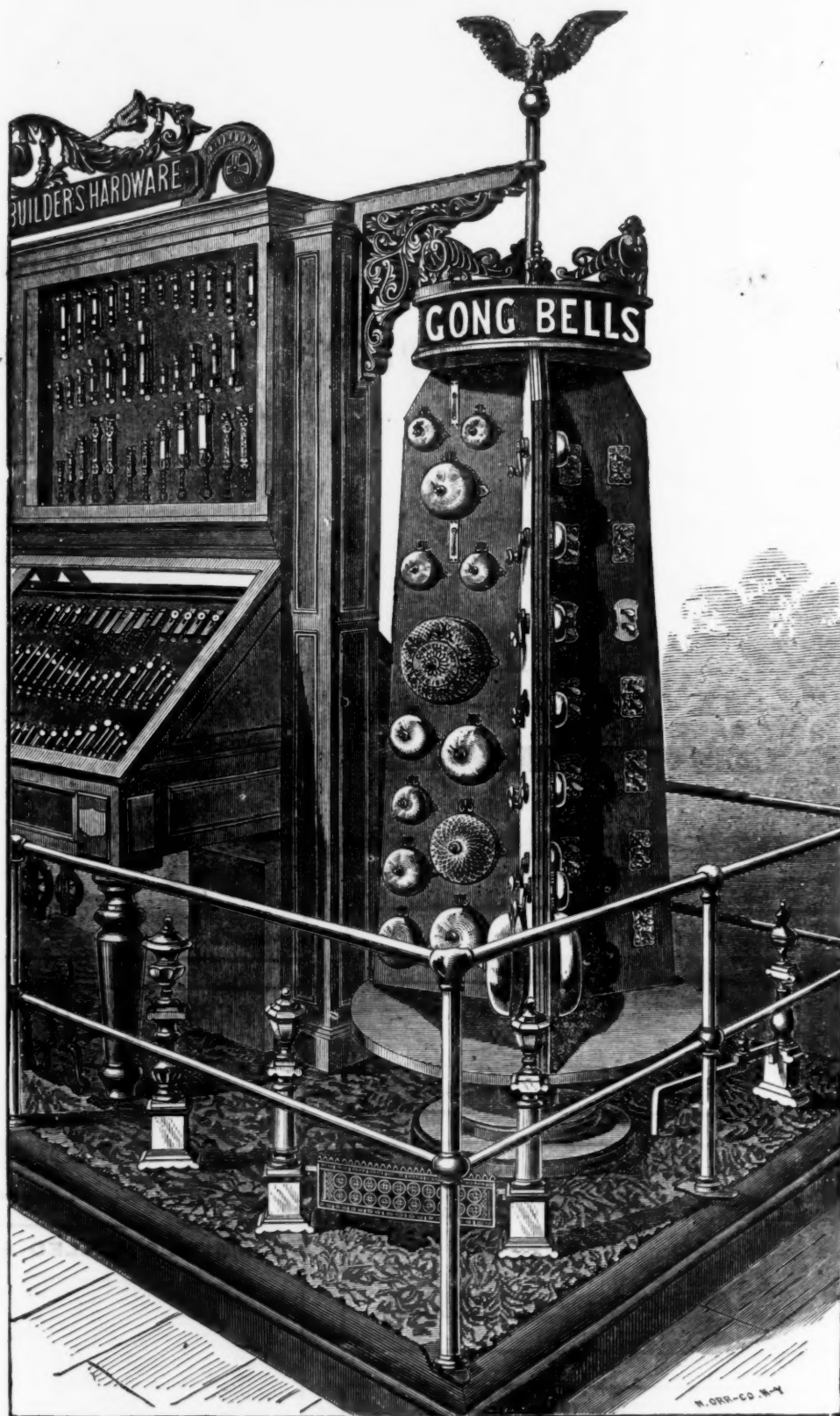
107 Chambers and 91 Reade Sts.,

NEW YORK.

Factories at Kensington, Connecticut.

OUR COMPLETE CATALOGUE FOR 1878,

Containing all the goods we manufacture, is now ready for distribution to our customers,

FREE OF CHARGE.

END VIEW OF THE

HART, BLIVEN & MEAD MANUFACTURING COMPANY'S EXHIBIT AT THE INTERNATIONAL EXHIBITION, PHILADELPHIA, 1876.

Now in use at our New Stores, Nos. 107 Chambers and 91 Reade Streets,

NEW YORK.

center of tower to face of anchorage. The frame work of the superstructure has a width of 86 feet, and is suspended from four 16-inch steel cables by means of suspenders. In the land spans the equilibrium of curves requires the main cables to be 8 feet below grade at the face of the anchorage, thus bringing the floor line above the cables for a distance of 250 feet out from thence; the suspenders are here replaced by posts standing on the cables. The grade of both sides is fixed at 3.25 feet per hundred. The main floor beams are suspended at a uniform distance of 7 feet 6 inches from center, with intermediate beams half way between them. There are six trusses running lengthwise of the bridge, so that transversely the structure is arranged in five divisions. The two outer divisions are each 13 feet 9 inches wide in the clear between the trusses, and are intended for vehicles, including horse cars, for which tramways are provided. All travel in one division in the same direction.

Two intermediate spaces of 12 feet 8 inches have steel rails laid in them, and are devoted to passenger cars run by endless ropes driven by stationary engines. The central space of 15 feet 7 inches is occupied by a promenade elevated 9 feet 10 inches above the other floors, except at the towers, where it is raised still higher, so as to pass around the intervening central shaft above the passenger cars.

The four middle trusses are 16 feet in depth, and the two outer ones 9 feet 6 inches deep. The trusses consist of vertical posts, each made of two 5-inch channels tied together with diagonal braces, a top chord composed of two 9-inch channels with an overlying flat plate, a bottom chord of two 9-inch channels below and two 6-inch channels on top of the floor beams, and truss rods of flat eye bars secured to the posts and chords by pin connections. The sections of the chords, and also of the diagonals, are proportioned to meet the requirements of their respective locations, being somewhat heavier at the quarters than at the center. The over-floor stays extend 437 feet out from the center of the towers, and for that distance the lower chord section is proportioned to resist the horizontal thrust of the stays. This section is greatest at the towers, where the trusses are further strengthened so as to sustain their own weight for 50 feet on either side. At the towers the trusses are anchored down to eye bars built in the masonry.

The dimensions of this truss work in the towers differ slightly, because the New York tower, is 3 feet wider than the Brooklyn tower in the direction of the line of the bridge. The first floor beam, however, is in each case placed at the same uniform distance from the center of the tower. All truss posts are laterally supported by braces of T or angle iron, and each pair of high trusses is connected overhead and then laterally braced. Expansion and contraction of the structure is provided for in four places, by means of slip joints in the trusses and framework, located beyond the end of the over-floor stays, about 445 feet from the towers. At the towers all parts are firmly anchored to the masonry, a most essential condition in a locality so exposed to storms as the present one. By the introduction of these slip joints it becomes possible to rivet all parts of the framework together in a rigid, unyielding manner, thus giving much greater efficiency to the trusses than has previously been obtained in other wire cable bridges. In the land spans, however, where the floor lies for about 250 feet above the cables, the iron framework is attached to the latter in such a manner as to make continuous riveting impracticable. The expansion is here provided for by making oval bolt holes in the splicing plates of the chords, thus making short divisions of about 30 feet in length, in which the small amount of expansion can accommodate itself. Any impairment in rigidity, caused by these smaller slip joints, is made up by an increased depth of truss at this point. In that portion of the land spans where the cable passes below the floor, the ordinary cable band no longer suffices for an attachment, but is replaced by a special contrivance for each point, so arranged as to admit of raising or lowering the floor beams for the purpose of regulating the grade.

The weight of the iron required for the superstructure of the East River Bridge is estimated at 5800 tons. The iron used must meet the following requirements: It must have a tensile strength of not less than 50,000 pounds per square inch. Tested in lengths of one foot, it must elongate 15 per cent., and the area of section at the point of fracture must be reduced 25 per cent. The steel used must have an ultimate strength of 80,000 pounds per square inch and an ultimate stretch of 15 per cent. in lengths of one foot.

Antique Bronzing.—The repeated applications in copper or brass of alternate washes of dilute acetic acid and exposure to the fumes of ammonia will give a very antique-looking green bronze, but a quick mode of producing a similar appearance is often desirable. To this end the articles may be immersed in a solution of one part of perchloride of iron in two parts of water. The tone assumed darkens with the length of immersion. Or the articles may be boiled in a strong solution of nitrate of copper. Or, lastly, they may be immersed in a solution of two ounces nitrate of iron, and two ounces hyposulphite of soda in one pint of water. Washing, drying, and burnishing complete the process.

Since 1840 the fastest steamships in the Atlantic trade have increased their speed from 8.3 knots per hour to 15.6 knots, and the consumption of fuel per 100 indicated horse-power has been reduced from 4.7 hundredweight to 1.9. In 1877 there were 182 steamers of 556,650 tons in the service, of which 125 of 377,995 tons were English. The record of rapid passages since 1840 shows a gradual reduction from 14 days to 7, and during the same time 56 steamers have been lost, with 5430 lives. The year 1873 was the most disastrous of any, 7 vessels with 829 lives being lost, among them the Atlantic, with 545 lives. In 1854 the City of Glasgow, with 480 lives, and the Arctic, with 322 lives, were lost, making that year the next to 1873 the worst on record.

H. D. SMITH & CO.,

Plantville, Conn.,

Manufacturers of

CARRIAGE MAKERS' FORGED IRONS.

At the Philadelphia International Exhibition,
RECEIVED THE HIGHEST COMMENDATION.



TRADE MARK.



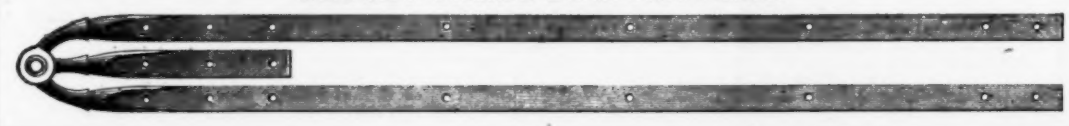
TRADE MARK.

REPORT OF THE CENTENNIAL COMMISSION:

"A Large and Splendid Exhibit, of Superior, Practical, and Useful Articles."

SMITH'S FORGED SLAT IRONS.

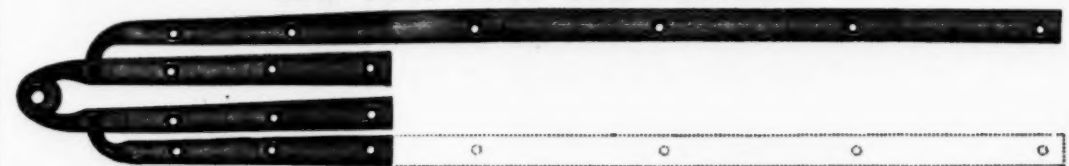
SOCKET THREE BOW PATTERN.



SOCKET FOUR BOW PATTERN.



NEW YORK FOUR BOW PATTERN.



SMITH'S IMPROVED PHILADELPHIA PATTERN. (4 Bow.)



PHILADELPHIA EXTENSION TOP PATTERN. (Five Bow.)



IMPROVED PATTERN THOMAS TOP PROPS.



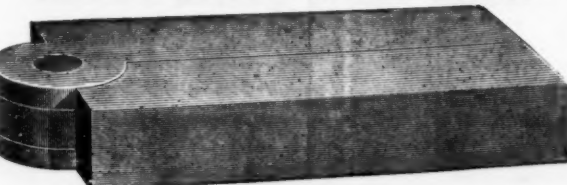
THOMAS PATENT TOP PROPS.



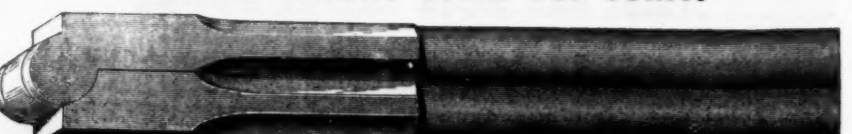
CURVED PATTERN TOP PROPS.



SMITH'S MILLED STUMP JOINT.

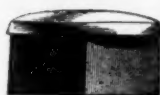


SMITH'S PATENT SOLID TOP JOINT.

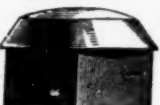


PROP NUTS.

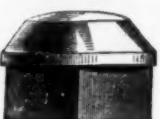
No. 14.



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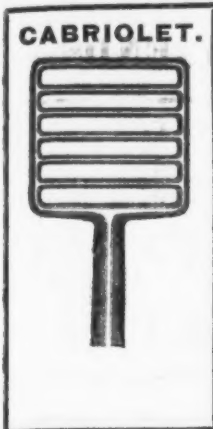


See Illustrations on the two pages following this.

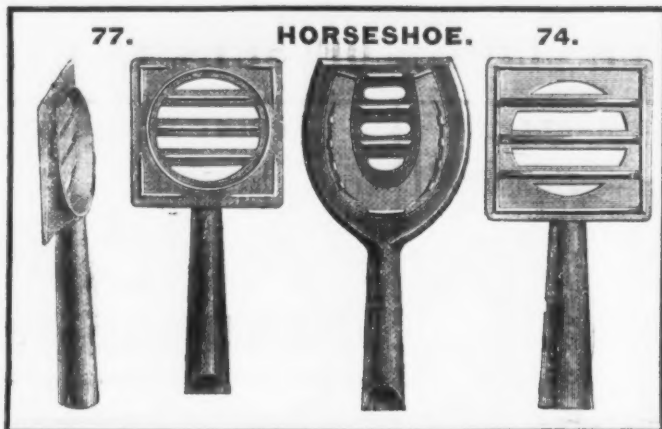
H. D. SMITH & CO.,

MANUFACTURERS,
Plantville, Conn.

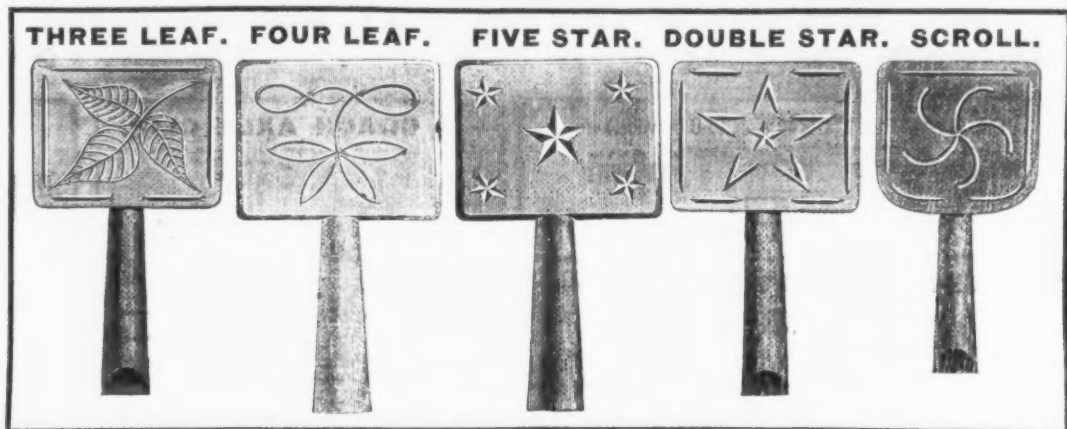
GRIDIRON.



PATENT CROSS BAR.

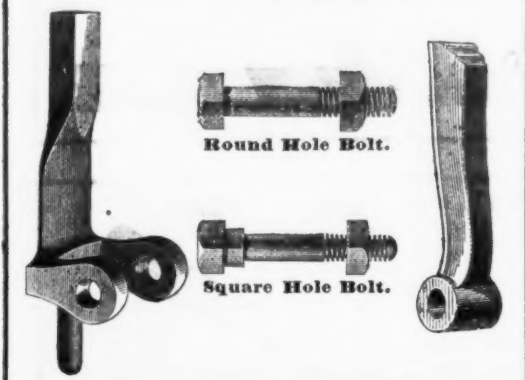


PATENT EMBOSSED STEP PADS.



Smith's Interchangeable Shaft Couplings.

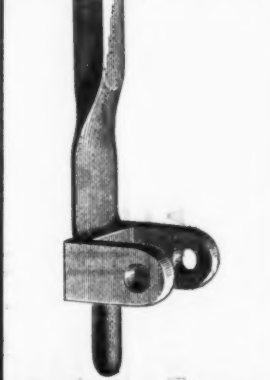
SMITH'S PATTERN.



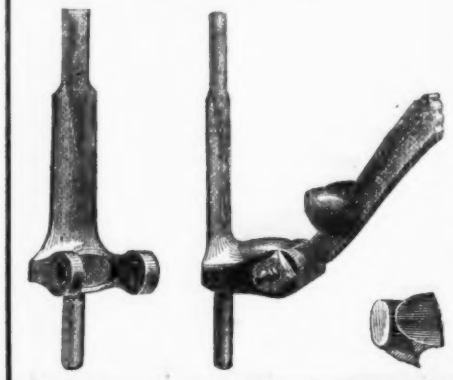
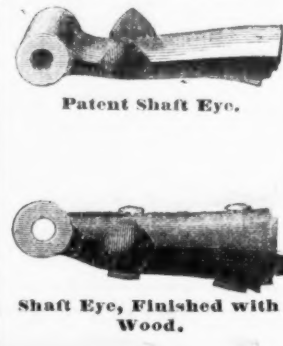
PATENT NOISELESS.



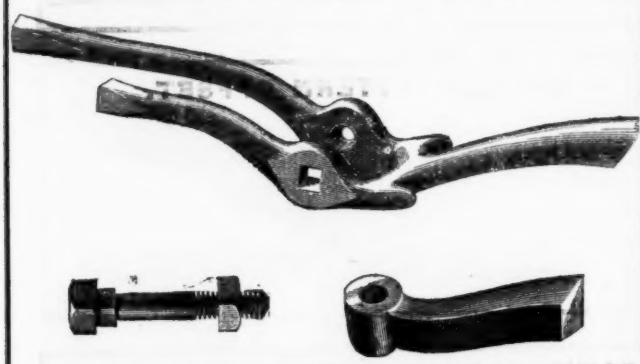
STRAIGHT EAR.



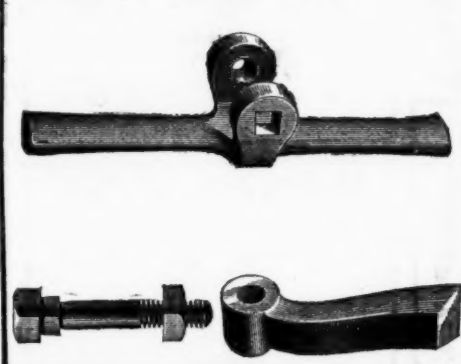
CENTRAL PARK.

PATENT 1871
SHAFT EYE.

SLEIGH, PORTLAND PATTERN.



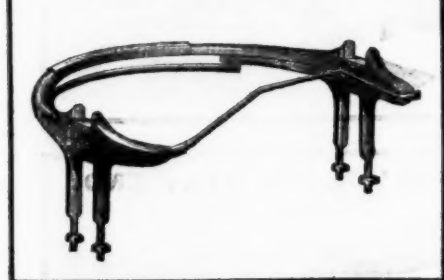
SLEIGH, ALBANY PATTERN.



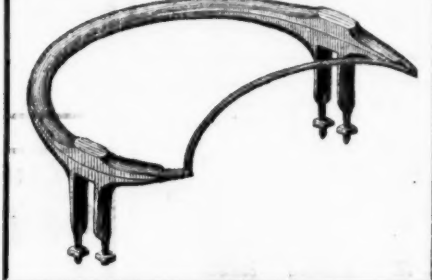
PLAIN PATTERN.

SPRING COUPLINGS.
Platform. Side Bar.

No. 6 PATTERN.



No. 3 PATTERN.



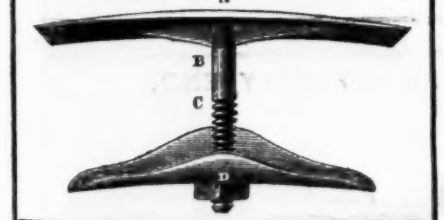
PERCH AND BED PLATE.



SOLID STEP SHANK.



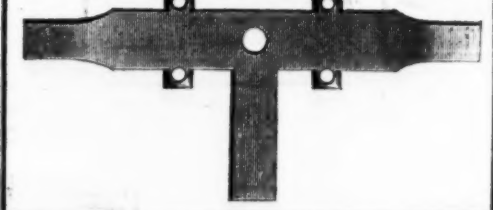
FELLOE HOLDER.



EXCELSIOR KING BOLT.



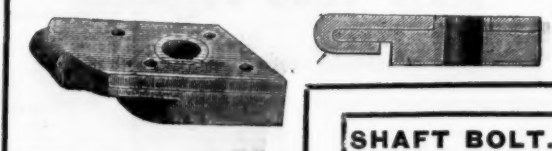
HEAD BLOCK PLATE.



5th WHEEL.—Anti-Rattler.



BREWSTER WHIFF. PLATE.



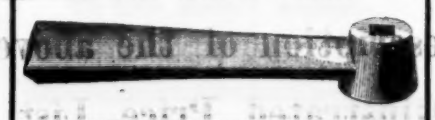
FELLOE JOINT BOLT.



LIP BODY LOOP.



PLAIN BODY LOOP.



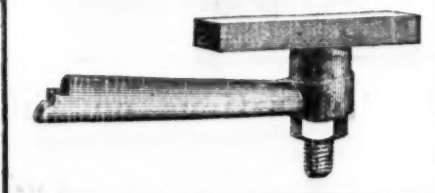
SHAFT BOLT.



NEW YORK PATTERN.



YOKE AND BRACE.



See Illustrations on the preceding and following page.

H. D. SMITH & CO.,

MANUFACTURERS,

Plantsville, Conn.,

AXLE AND SPRING BAR CLIPS.

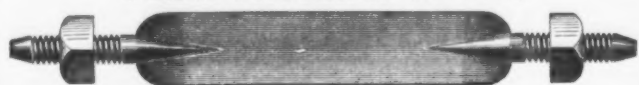
PLAIN PATTERN. (5-8 in. wide.)



DOUBLE POINT PATTERN. (5-8 in. wide.)



PLAIN PATTERN. (7-8 in. wide.)



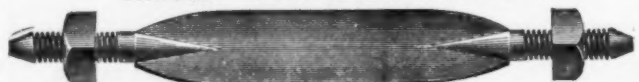
PLAIN PATTERN. (Edge View.)



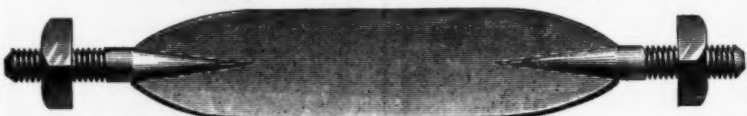
PLAIN PATTERN. (1 in. wide.)



"ANVIL" PATTERN. (7-8 in. wide.)



HEAVY AXLE CLIP. (3-8 in. Shank.)



EXTRA HEAVY AXLE CLIP. (7-16 in. Shank.)



SMITH'S SPRING BAR.



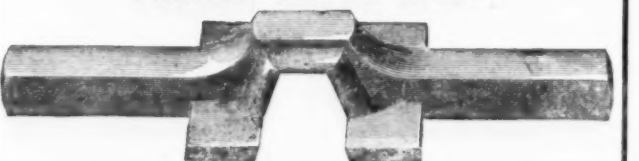
PLAIN SPRING BAR.



AMERICAN COACH CLIP.



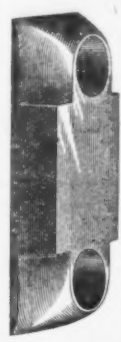
FRENCH COACH CLIP.



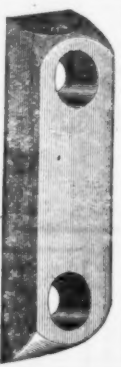
COACH AXLE CLIP.



SMOOTH FINISH YOKE.



PLAIN PATTERN YOKE.



LOOP YOKE.

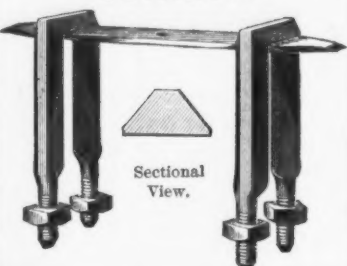


SADDLE CLIPS.

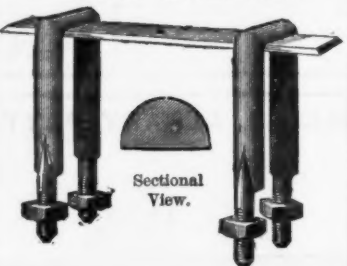
AXLE SADDLE.



OCTAGON.



SOLID DOUBLE.



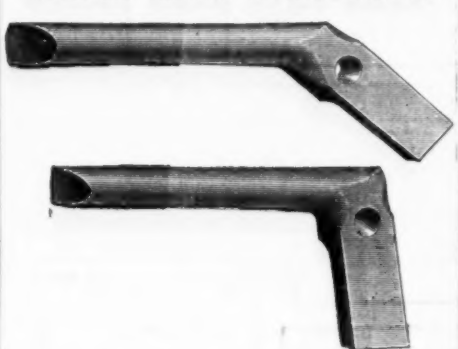
BREWSTER PATENT.



SKELETON.



ROUND BACK STAY ENDS.



SPRING CLIP.

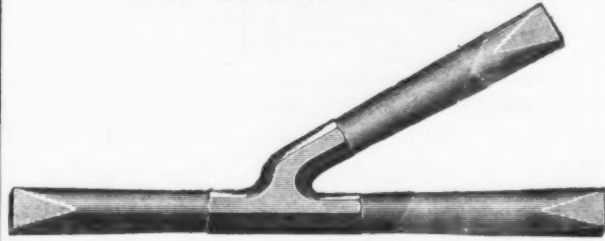


OFFSETS AND STAY ENDS.

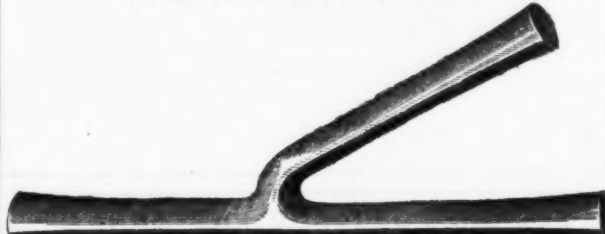
POINT OCTAGON OFFSET.



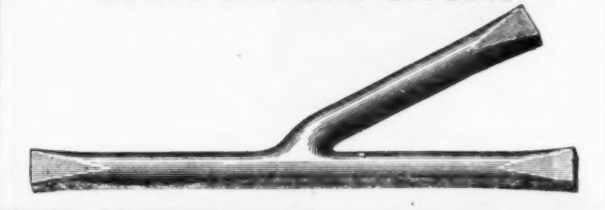
PLAIN OCTAGON OFFSET.



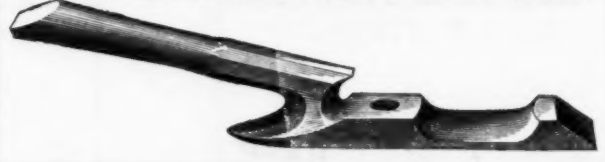
OVAL PATTERN OFFSET.



ROUND PATTERN OFFSET.



POINT OCTAGON FRONT STAY END.



PLAIN OCTAGON FRONT STAY END.



ROUND FRONT STAY END.



OVAL FRONT STAY END.



See Illustrations on the two pages preceding this. For description of the above and other popular Forged Carriage Irons, send for 1877 Illustrated Price List.

B. KREISCHER & SON,
New York Fire Brick &
STATEN ISLAND
CLAY RETORT WORKS,
 Established 1845.
 Office, foot of Houston Street, East River,
 NEW YORK.

The largest stock of Fire Brick of all shapes and
 sizes on hand, and made to order at short notice.
 Cupola Brick, for McKenzle Patent,
 and others. Fire Mortar, Ground Brick, Clay and
 Sand. Superior Kaolin for Rolling Mills and Found-
 ries. Stone Ware and other Fire Clay and Sand,
 from my own mines at New Jersey and Staten Island,
 by the cargo or otherwise.

NEWTON & CO.,
 Successor to
PALMER, NEWTON & CO.,
 ALBANY, N. Y., Manufacturers of
FIRE BRICK
Stove Linings,
Range and Heater Linings
 Cylinder Brick, &c., &c.

M. D. Valentine & Bro
 Manufacturers of
FIRE BRICK
And Furnace Blocks
DRAIN PIPE & LAND TILE.
 Woodbridge, - - - N. J.

A. HALL & SONS, Perth Amboy, N. J.
 ESTABLISHED 1845.
HALL & SONS, Buffalo, N. Y.
 ESTABLISHED 1866.
FIRE BRICK

of reliable quality for all purposes, manufactured to
 the best New Jersey Fire Clays. Also, Architectural
 Terra Cotta, Fire Clay, Fire Sand, Kaolin, Ground Fire
 Brick and Diamond Building Brick.

Brooklyn Clay Retort
 AND
FIRE BRICK WORKS.

Manufacturers of Clay Retorts, Fire Bricks, Ga-
 House and other Tile, Cupola Brick, &c. Dealers in
 and Miners of Fire Clay and Fire Sand. Clay bank at
 Burt's Creek, New Jersey. Manufacture: Van Dyke,
 Elizabeth, Richards and Partition Sts., Brooklyn, N. Y.
 Office No. 28 Van Dyke St.

Watson Fire Brick Manufactory

ESTABLISHED 1866.
JOHN E. WATSON, Perth Amboy, New Jersey.
 Manufacturer of
FIRE BRICK,
 For Rolling Mills, Blast Furnaces, Foundries,
 Gas Works, Lime Kilns, Tanneries, Soller
 and Grate Setting, Glass Works, &c.
 FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE

HENRY MAURER,
 Proprietor of the
Excelsior Fire Brick & Clay
Retort Works,

Manufacturer of **FIRE BRICK, HOLLOW**
BRICK AND CLAY RETORTS.
 WORKS: 11TH AVENUE, NEW JERSEY
 Office & Depot: 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS

Troy, N. Y.,
JAMES OSTRANDER & SON,
 ESTABLISHED 1848,
 Manufacturers of
FIRE BRICK,
 Teyeres, Tiles, Blast Furnace Blocks, etc. Miners and
 Dealers in Woodbridge Fire Clay and Sand, and Staten
 Island Kaolin.

Established 1864.
GARDNER BROTHERS,

MANUFACTURERS OF
STANDARD SAVAGE
Fire Brick, Tile & Furnace Blocks,
 OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings,
 AND
 Miners and Shippers of Fire Clay.
 OFFICE: 375 Penn Ave., Pittsburgh, Pa.
 WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

BORGNER & O'BRIEN,

Manufacturers of
Fire Bricks,
Clay Gas Retorts,
Retort Settings,
Tiles, Blocks, &c., &c.
 23d St., below Vine,
 PHILADELPHIA.
 Eighteen years' practical experience.
 CYRUS BORGNER, WM. J. O'BRIEN

ANCHOR BRAND
A X L E S,

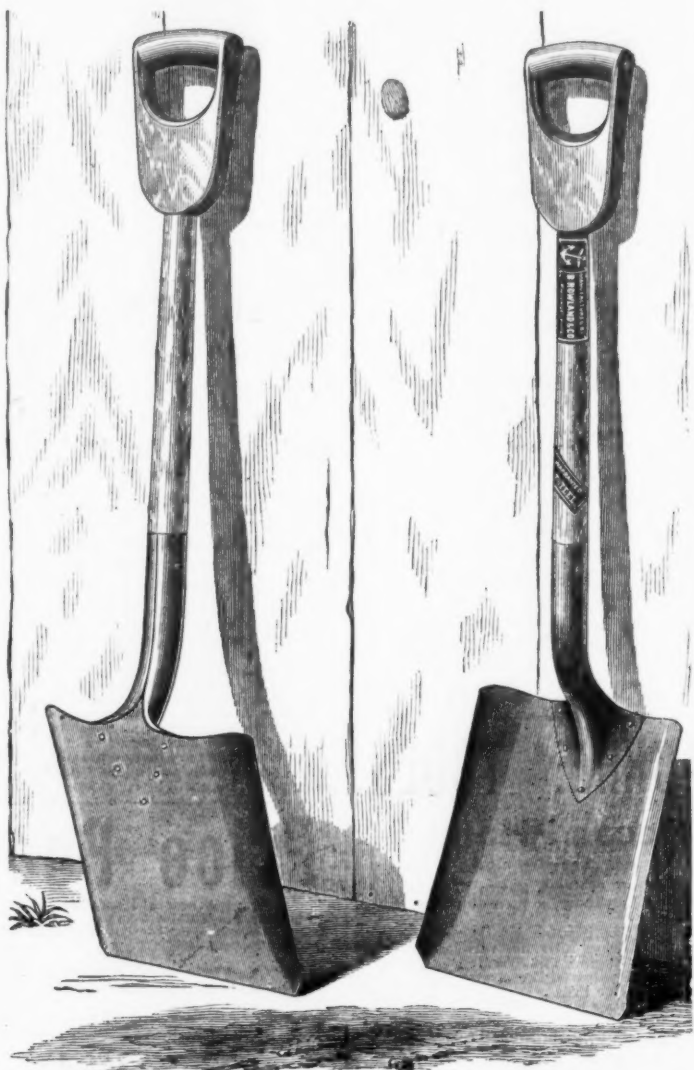
For all Styles Carriages and Wagons.
 Annual production 180,000 sets.
SHELDON & CO., Auburn, N. Y.

CHAS. N. BACON,
Felting & Wadding Manufactory,
 Winchester, Mass.

Patent Felt Buffer Wheels for Hardware and
 Cutlery Manufacturers, Brass Finishers, Nicke-
 lers, Platers, Jewelers, &c. Felt for Booters and Steam
 Pipes, Harness Makers, &c. Patent Black Board
 Brushes.
 Office & Salesroom 72 Exchange Place Boston.



B. ROWLAND & CO.,
 PHILADELPHIA.



B. Rowland & Co.'s Patent Riveted Shovel.
CAST STEEL.

We would particularly call the attention of the trade to the Patent B. Rowland & Co.'s Anchor Brand Shovel, as now manufactured by us, possessing as it does improvements in construction which render it the most perfect STRAP Shovel made. In it the old style of back strap is entirely dispensed with, and a front strap substituted, riveted and clamped firmly to the blade, clasping the handle in the manner of a ferrule, thus obviating all danger of tearing off strap and making a more beautiful finish front and back. These improvements add to the appearance of the shovel, enhancing its durability at least one-third, and warrant the assertion that all the Shovels we manufacture from this patent will prove the most desirable ever offered the consumer.

The above advantages are also especially noticeable in our Spades and Scoops under the same patent.

B. Rowland & Co.
CAST STEEL.



All goods of this brand (which is copyrighted) are warranted in every respect, and we will guarantee that the following named PATENT RIVETED Shovels and Spades will be made from the gauge of Cast Steel specified:

D Handle Square Point Shovel	13 gauge
D " Round " " "	14 " "
Long Handle Round Point Shovel	15 " "
D Handle Spades	11 " "
D " Western Coal Shovel	15 " "
D " Anthracite Coal Shovel	14 " "

Gauged by Stubbs' Gauge.

B. ROWLAND & CO.,

CITY OFFICE,
 27 North Fifth Street, Philadelphia, U. S. A.
 Works at Frankford, Phila., U. S. A.

NEW YORK WAREHOUSE, 100 Chambers St.

Commerce of the United States with Japan.

The following statement shows the value of the commerce of the United States with Japan for each of the eighteen fiscal years ended June 30 (from 1859 to 1876 inclusive), compiled from the United States official reports on commerce and navigation:

Years.	Domestic Exports.	Foreign Exports.	Total Exports.	Imports.	Total Commerce.
1859.....	\$89,856	\$48,918	\$138,774	\$205	\$239
1860.....	14,876	25,677	40,553	102,566	143,119
1861.....	35,348	87,098	122,446	87,513	210,463
1862.....	38,434	52,671	91,105	73,851	164,956
1863.....	42,769	22,000	64,769	270,557	335,326
1864.....	47,551	60,221	107,772	285,176	392,948
1865.....	50,135	109,072	159,207	1,815,364	2,348,136
1866.....	750,168	85,872	836,040	2,018,487	3,418,595
1867.....	2,836,720	1,119,341	3,956,061	2,420,182	6,376,243
1868.....	915,665	614,049	1,529,714	3,245,317	4,775,029
1869.....	987,675	642,666	1,630,341	4,183,365	5,813,706
1870.....	4,392,486	123,777	4,516,263	5,387,991	9,904,254
1871.....	7,664,058	401,667	8,065,725	9,174,243	17,240,000
1872.....	1,808,107	61,040	1,869,147	9,853,374	11,722,521
1873.....	1,647,197	14,736	1,661,933	6,480,370	8,142,307
1874.....	1,095,457	3,309	1,101,766	7,772,302	9,434,235
1875.....				15,508,170	16,609,936
1876.....					
Total for eighteen years.....	\$23,645,572	\$3,485,424	\$27,130,996	\$68,758,244	\$95,883,240
Average per annum.....	1,313,643	193,634	1,507,277	3,819,569	5,326,846
Average per annum for last ten years.....	2,273,047	317,663	2,590,710	6,066,180	8,656,890
Average per annum for last five years.....	3,316,021	120,946	3,436,967	9,539,492	12,976,459
Average per capita of population of Japan (33,110,825, c. 1872).....			\$0.10	\$0.20	\$0.30

The following statement shows the several ports in the United States at which exports were made to Japan and imports received from Japan, and the value of the same at each port, during the fiscal year ended June 30, 1877, compiled from the official report on commerce and navigation:

Ports.	Domestic Exports.	Foreign Exports.	Total Exports.	Imports.	Total Commerce.
New York.....	\$646,450		\$646,450	\$2,812,925	\$3,459,375
Philadelphia.....	41,535		41,535		41,535
San Francisco.....	1,851,656	385,243	2,236,899	10,876,433	13,113,332
Willamette, Oregon.....				75	75
Totals.....	\$2,539,641	\$385,243	\$2,924,884	\$13,689,433	\$16,614,317
Carried in American vessels.....	\$1,095,982	\$81,305	\$1,177,287	\$5,770,818	\$6,948,105
Carried in foreign vessels.....	1,443,659	303,938	1,747,597	5,105,615	6,853,212
Totals.....	\$2,539,641	\$385,243	\$2,924,884	\$13,689,433	\$16,614,317
Total imports dutiable.....				\$290,731	2 per cent.
Total imports free of duty.....				13,398,702	98 per cent.
Totals.....				\$13,689,433	
Total exports of merchandise.....			\$1,252,346		43 per cent.
Total exports of specie.....			1,672,538		57 per cent.
Total.....			\$2,924,884		
Total imports of merchandise.....				\$13,687,061	
Total imports of specie.....				2,372	
Total.....				\$13,689,433	
Proportion of total commerce carried in American vessels.....					42 per cent.
Proportion of total commerce carried in foreign vessels.....					58 per cent.
Proportion of total commerce at New York.....					21 per cent.
Proportion of total commerce at San Francisco.....					79 per cent.

INDUSTRIAL ITEMS.

MAINE.
 The Todd Non-Freezing Hydrant Company of Portland are making and selling a hydrant which has been demonstrated to be "non-freezing beyond a doubt." It has been so pronounced by fire engineers and underwriters, and is a most valuable invention when we consider how much delay and inconvenience is incurred by the fire departments of all cities during the winter season, on account of the freezing of hydrants.—*Commercial Bulletin.*

MASSACHUSETTS.
 The cotton mill of the Hayden Manufacturing Company at Haydenville, which was built by Gov. Hayden about 25 years ago at a cost of \$120,000, has been sold at auction for \$19,900 to W. B. Hale, president of the Northampton First National Bank. The attendance was small and the bidding dull. The property is at present assessed for about \$50,000 for taxes.

The Gilbert & Barker Manufacturing Company of Springfield are now making fully one-third more of their gas machines than in any previous year, and have now about 1700 in use.

The Henry Seymour Cutlery Company removed from New York to Holyoke last February, and now employ 65 hands. They produce nearly 400 dozen pairs of scissors and shears per week, and will soon increase their capacity to nearly double that amount. Some 250 different styles and sizes are produced.

The Holyoke Machine Company are supplying two 54-inch turbine water wheels for the water works at Lewiston, Me.

A new firm is just starting in fine brass and copper wire drawing, and in the manufacture of wire cloth for paper makers and other uses. The firm are Buchanan, Bolt & Co., known as the Holyoke Wire Works, and are all experienced mechanics, with from 18 to 40 years' experience in wire making.

CONNECTICUT.
 Another order from Cuba for a sugar mill—a duplicate of the big one built last year—has been received at the Farrell foundry in Ansonia.
 The Smith & Egge Manufacturing Company, Bridgeport, have, throughout the dull times, been running 10 hours with a full complement of men, and their trade is steadily increasing. They were awarded the contract by the Post Office Department for making all the locks used by them on the street letter boxes.

NEW YORK.
 Affairs continue prosperous at the iron works. There is no diminution of work at the steel works, Rensselaer works or in any of the Messrs. Burdett's mills, and Corning & Co.'s Star Forge, steam and water mills still run on alternate weeks.—*Troy Times.*
 The American Stone Works, of Peekskill, have failed for \$200,000.

Messrs. Babcock & Wilcox, No. 30 Cortlandt street, are to erect two of their well-known water tube boilers, of 60 horsepower each, in the apartment house now building on seventh avenue, between fifty-fifth and fifty-sixth streets. This extensive structure is the property of Mr. Edwin Clarke, President of the Singer Manufacturing Company, and is in charge of Mr. H. J. Hardenbergh as architect.

PENNSYLVANIA.
 Pursuant to a call, upward of 400 of the employees of Kimberly, Karns & Co. met last Thursday morning to take action in the matter of the suspension of that firm. Mr. John Fullerton presided. A vote of confidence in the firm passed unanimously, and it was resolved that the employees should resume and continue work as long as the firm would run the works, the matter of pay to be

adjusted as will best suit the company. The meeting was very large and harmonious, and its action seems the very wisest that could have been taken. We earnestly hope so me arrangements will be made whereby the works will continue in operation with profit to all parties.

The Standard Pipe Covering Co., of Philadelphia, are now making a pipe covering invented by Geo. H. Levis. It consists of a pipe or tube made from plaster of Paris and sand, covered with prepared paper. This pipe or tube has an air space between it and the pipe covered, so that the loss of steam is very slight.

The Cambria Iron Works, at Johnstown, have contracted to furnish 5000 tons of rails for the Burlington and Missouri Railroad, in Nebraska. They are to be manufactured at the rate of 1000 tons per month, and work upon the first installment has been commenced.

Coffrode & Saylor, of Pottstown, are building nearly two miles of iron bridges for the Pittsburgh and Lake Erie Railroad.

Messrs. Kaufman, Killinger & Co. are the owners of Ellendale Forge, located on the Schuylkill and Susquehanna branch of the Reading Railroad, about 12 miles from Harrisburg. The capacity of the establishment is 1200 tons of blooms per annum. It requires 1½ tons of pig iron, 75 bushels of charcoal and 22 bushels of coke to produce one ton of blooms, which are worth two cents per pound.

The machine shop and foundry of Wm. F. Mosser, Agent, at Allentown, is at present well supplied with orders, and employs 28 men, who work 12 hours a day. Mr. Mosser manufactures the Allentown Water Wheel, and also the Keystone Park Mill.

The firm of Ford & Hallman, Norristown, are erecting a large stone building to facilitate their increased business in the machinery and foundry line.

Mr. Isaac Smith, of Valley Forge, announces that his mill will shut down for repairs on the 1st of July next.

The rail mill of the Allentown Rolling Mill started up Tuesday evening, the 28th inst., to continue work all week, and longer if additional orders are received. The puddle mill is in operation.

Repairs are going on rapidly at the furnace at Scottsdale. The work of relining the furnace will soon begin, and she will be ready for starting in about a month.

It is currently rumored on the streets that the extensive rolling mill of E. & G. Brooke, this borough, is to be greatly enlarged in a short time. The improvement will almost double its facilities, and make it one of the most extensive mills in the State.—*Birdsboro' Tribune.*

The contract for a new and substantial iron bridge on the Lebanon Valley Railroad, over the Schuylkill at Reading, has been awarded by the Philadelphia and Reading Railroad Company to the Phoenix Iron Company, of Phoenixville. This structure is intended to replace the present wooden trestle-work bridge, which was erected after the destruction of the fine railroad bridge over the Schuylkill River at the same place by the rioters and bridge burners in July last. And later, Clark, Reeves & Co. have secured the contract for the erection of a number of bridges for the Great Western Railway of Canada.

Bailey's new plate mill in South Harrisburg is running a double set of men and is kept in operation day and night.

The Maiden Creek Furnace at Lenhartsville was lighted up on Tuesday night, the 28th ult., at 10 o'clock. The furnace is now in full blast and working admirably. Jacob K. Spang, of Reading, one of the proprietors, was present when the furnace was blown in.

The firm of Potter & Hoffman, of Philadelphia, was dissolved on the 1st of June. Business will be carried on as before by Mr. Hoffman under the style of J. W. Hoffman & Co.

Mr. John W. Nystrom has opened an engineering office at 220 South Fourth street, Philadelphia, principally for the construction of machinery, boilers and steamers.

Mr. T. L. Weimer, of the Weimer Machine Works, has quite a number of men at work taking apart and loading on cars for shipment the large blowing engine he has built for the Messrs. Eckert of Reading. It was tested week before last for the purpose of ascertaining its full power. "The engine, though far from being the largest ever built at the works," says the *Lebanon Courier*, "is one of the most powerful in the country. From the records of the engine's performance we take the following:

Diameter of blowing cylinder..... 72 inches.
Diameter of steam cylinder..... 36 "
Stroke of both..... 48 "
Highest speed attained per minute..... 60 revolutions.
Air pressure..... 14 lbs.
Cubic feet air discharged per min..... 13,500
Greatest power developed..... 700 horse.
Working duty of engine..... 40 revolutions.
Cubic feet air per minute at working duty..... 9,000 inches.

A large cotton press with new improvements is being made at the Scott Foundry of the Reading Iron Company for a Southern party.

The Crowther Furnace at New Castle has been blown in.

A new iron ore mine will be opened on the premises of Lewis S. Lichtenwaller, in Longwamp township. The necessary machinery is being erected by the Allentown Iron Company, which will operate the mine.

Messrs. Gilham & Fisher, Reading, manufacturers of the Champion Refrigerators, have completed a large and handsome refrigerator car, similar to those heretofore manufactured by Frederick Laurer, which was sent on Tuesday last week to Bergher & Engel, of Philadelphia.

PITTSBURGH AND VICINITY.

The Hoop Mills of Lindsay & McCutcheon, Allegheny City, are running double turn.

Messrs. Riter & Conley, Pittsburgh, have commenced the construction of a 25,000-gallon iron oil tank, to be located at Oil City.

Kier Bros., Pittsburgh, manufacturers of "Salina" fire-brick, are running their works full time and are receiving a good demand for their brick.

Messrs. John B. Harker & Co., Pittsburgh, manufacturers of annealed stove ware, are lately in receipt of some very large orders from St. Louis, compelling them to run their factory double turn for the last two weeks.

The parties in Cincinnati who had been buying inferior glassware and branding it as the product of Wm. McCully & Co., glass manufacturers of Pittsburgh, have been enjoined from doing so in the future, and a commission has been appointed to estimate the profits obtained from the ware thus falsely branded, which are to be paid to McCully & Co. as damages.

Messrs. Gillespie Bros. & Co., Pittsburgh, manufacturers of oil well supplies and iron and steel forgings, are now employing about 50 men, and are running their works from 7 o'clock in the morning until 10 o'clock at night, and with good prospects for the summer. They received last week some very large orders from the West and South, necessitating the employment of a larger force of men. They have lately commenced to manufacture a patent wood workers' rasp or float, which is considered the best tool of the kind for reducing soft metals and hard woods. They have just received from a Western firm an order for 5000 of these rasps, and are now putting in special machinery for their manufacture.

OHIO.

The *Independent* says the Russia and Niles Iron Companies' mills are running steady, with plenty of orders ahead.

The Enterprise Glass Works at Ravenna make 50,000 lamp chimneys per week. It is reported that the keeper of the Lowell Furnace has received orders to get it in readiness to blow in. It has been idle between four and five years.

Work has been commenced on a large building at Geneva which, when completed, will be used for the manufacture of all kinds of locks and door and window trimmings. A new company has just been organized at Youngstown for the manufacture of cotton ties. It is called the United States Iron Company, and it has the right to use Plinn and Weir's patent buckle. The building is nearly finished, and arrangements are about completed for doing a very large business.

On Saturday, the 24th ult., Brown, Bonnell & Co., Youngstown, sent to each of their puddlers a letter, of which the following is a copy:

YOUNGSTOWN, May 25, 1878.
DEAR SIR: On the 1st day of June next we will stop the puddling department of our works, and will not start again until there is some inducement offered for us to do so. We do not, therefore, require your services after that date, and will settle your account in full on our next regular pay day (June 8th). We regret very much that we are compelled to pursue this course, as our relations with you have always been very pleasant.

Respectfully,

BROWN, BONNELL & CO.

The Lake Erie, Alliance & Wheeling Railroad has been sold to the Cleveland Rolling Mill Company.

The cotton-tie mill recently added to the Youngstown Rolling Mill is in operation.

WISCONSIN.

Filer, Stowell & Co., of the Cream City Iron Works, Milwaukee, are making shipments of machinery to J. F. Colord, at Jessup, Georgia.

MISSOURI.

The Missouri Car and Foundry Company, of St. Louis, have just finished 25 Tiffany refrigerator cars for the Anheuser Brewing Company, and 10 circus cars for Cole & Co. They are now building 260 box cars for the Chicago and Alton, and have contracted to build 200 box cars for the Missouri River, Fort Scott and Gulf, 100 for the Kansas City, St. Joseph and Council Bluffs, and 100 for the Receiver of the Chicago, Pekin and Southwestern railway. They have also four narrow-gauge passenger cars under way, and bids awaiting decision for several hundred more cars.

INDIANA.

The machine shops of the Indianapolis, Peru and Chicago Railway at Peru were struck by lightning on the night of the 29th ult., and with the contents were burned. The loss is estimated at \$100,000. No insurance.

KENTUCKY.

Mr. J. A. Hall is about to build at the Eagle Plow Works in East Mayesville, a large brick warehouse similar to the one constructed on the same lot several years ago.

MICHIGAN.

The plate mill at Wyandotte started up on Monday morning, the 27th ult. It is working on a large specification of tank iron from Chicago.

ALABAMA.

Copper Hill Mining Company have a paying property in Claiborne County, 30 miles from Oxford, on Selma, Rome and Dalton Railroad, and 28 miles from a branch of the West Point road. The company have heretofore shipped their matte to Baltimore, but that policy will now be abandoned, as they are preparing to do their own refining, and will hold what matte they make until the necessary additional plant shall be completed. There are now in operation three reverberatory furnaces and one blast furnace. They will push to completion a blister furnace and a refiner, and will have them in operation by Sept. 1. The ore is the same as that worked at Ducktown, Tennessee, this company, however, operating but one vein, a yellow sulphuret from 23 to 30 feet thick, and yielding about 7½ per cent. of refined copper.

TENNESSEE.

The Leadvale Lead Works are situated at a landing of that name on French Broad River, 40 miles north-east of Knoxville, in Sevier county. The company who first began working the mine being short of capital, pursued the policy of smelting what ore they could readily and cheaply come at and making the proceeds pay expenses of development. This plan did fairly for a couple of years, when the company fell out and went to court to settle the dispute. Then a receiver was appointed, and for two years last past the work has been in charge of two different receivers. One reverberatory and one slag furnace are now in operation, and are producing excellent lead, made entirely from low grade ore—about 60 per cent. and occasional lumps of galena found in the outcrop. No considerable pocket has yet been found, nor has a regular vein been reached, though bowlders of galena have been taken out, weighing from 1000 to 3000 pounds, which yield from 54 to 92 per cent. of fine metal. The shaft is now 80 feet deep, and the prospects that a regular vein or a large pocket will be found are excellent. The receiver is now making 1500 pounds of refined lead daily, for which he finds market at Chattanooga, Knoxville and other convenient points. Leadvale is within easy reach of Knoxville by water the year round, light draft boats being able to run to that point at low water.

MICHIGAN.

The Griffin Car Wheel Company of Detroit are running their foundry to its full capacity on wheels and other castings.

The Michigan Car Company are turning out 10 cars per day and are casting 200 wheels and about 25 tons of car castings daily in their foundry.

The Detroit Iron and Brass Works have plenty of orders and are running to their full capacity on hollow-ware.

American Representation and the International Jury.

The United States will be represented on the International Jury of the Exhibition by 37 members, a larger number than Commissioner-General McCormick expected to secure. The French authorities promise no salary or allowance for expenses to the jurors, and require them to be in attendance from early in June to the 1st of September. The following selections have been made: Class 1 and 2, oil paintings and various paintings and drawings, Frank D. Millet; class 5, engravings and lithographs, Joseph K. Riggs; class 7, organization and appliances for secondary instruction, John D. Philbrick; class 9, printing and books, Henry Stevens; class 10, stationery and bookbinding, painting and drawing materials, Charles C. Fulton; class 12, photographic proofs and apparatus, Joseph Tuckerman; class 13, musical instruments, Fred H. Post; class 14, medicines and hygiene and public relief, Dr. Thomas W. Evans; class 26, clocks and watches, Colonel Thomas W. Knox; class 40, portable weapons and hunting and shooting equipments, General Van Allen; class 43, mining and metallurgy, Professors W. P. Blake and H. B. Nason; class 46, agricultural products not used for food, Ashbel Smith; class 47, chemical and pharmaceutical products, Professor W. H. Chandler; class 49, leather and skins, A. H. Reitlinger; class 51, agricultural implements, F. C. Johnson; class 59, apparatus and processes used in manufacturing furniture and articles for dwellings, A. G. Wilkinson; class 66, civil engineering, T. E. Sickels; class 68, materials and apparatus for building purposes, General W. W. Davis; class 69, cereals and farinaceous products, Dr. Wm. E. Johnston; class 75, fermented drinks, Dr. Antoine Ruppner; class 76, farm buildings and agricultural works, Edward H. Knight; class 17, cheap and fancy furniture, Thomas B. Oakley; class 24, goldsmiths' and silversmiths' work, George T. Bourne; class 27, apparatus and processes for heating and lighting, Harry S. Homans; class 38, clothing for both sexes, James W. Tucker; class 54, machines and apparatus in general, Professor George Davidson; Thomas James Sloan, and B. B. Hotchkiss; class 55, machine tools, B. B. Hotchkiss and Charles R. Godwin; class 58, apparatus and processes for sewing and making clothing, Isaac H. Bursch; class 62, carriages and wheel-wrights' work, John Munroe; class 64, railway apparatus, Theodore Bronson, and class 72, meats and fish, George Wurts.

The Baldwin Locomotives in Europe.—A German paper says: A number of American machinists have been working lately in Eydtkuhn, Prussia, putting together the locomotives which the Russian

government bought in America, and which have recently arrived. The railway station at Eydtkuhn looks like an enormous storage place for engines, rails and other ironware. The American workmen, who are surrounded by observant crowds while at work, are truly remarkable for their aptness and skill, and particularly for their wonderful cleverness in handling tools. With the exception of the engineer in charge, they speak only English, and it is very laughable to hear the jaw-breaking that goes on between them and the German workmen.

Special Notices.

SPECIAL NOTICE.

The undersigned offer their services as agents to American Producers of Metals. They represent foreign brands of Zinc, Russia Iron, Hoop Iron, Window Glass, Cutlery and Guns. LOUIS WINDMULLER & ROELKER, 80 Reade Street, N. Y.

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy. A practical man with means is wanted to join a practical man who is already well established. Address CAR WHEEL FOUNDRY, P. O. Box 154, Selma, Alabama.

WANTED,

Controlling Agencies for saleable articles of Hardware manufacture, suitable for home consumption or export. ROYD & CHASE, Manufacturers of Oil Stones, 10714 St., N. Y.

Wanted,

SECOND-HAND ORE CRUSHER. Blake's preferred. State lowest cash price, where deliverable, condition and all particulars in detail. J. G. BATHIELE, Memphis, Tenn.

Eighty Bushels Charcoal

per cord of wood, or net profit of \$7 per cord, can be made by process protected by American, French and English patents. Small outlay required for machinery. Patentee has had 17 years' experience and can furnish good references. CHARCOAL WOODLAND, Office of The Iron Age, 220 E. 4th St., Philadelphia.

LEHIGH UNIVERSITY

Tuition Free. CIVIL, MECHANICAL AND MINING ENGINEERING; CHEMISTRY AND METALLURGY; FULL CLASSICAL INSTRUCTION; FRENCH AND GERMAN; ENGLISH LITERATURE; INTERNATIONAL AND CONSTITUTIONAL LAW; PSYCHOLOGY AND CHEMICAL EXPERIMENTS. For Register address, THE REV. JOHN M. LEAVITT, D. D., President, Bethlehem, Penn.

JUNE LIST, No. 1.

MACHINE TOOLS, Second-Hand.

Two Woodruff & Beach Steam Engines, automatic cut-off, cylinder, 30 inch diameter, 48 inch stroke.
One Flaklin Landing Machine Co. 16 in. x 26 Horizontal Steam Engine, with slide valve cut-off.
One Portable Engine, 7 in. cylinder.
One No. 3 Siles Gear Press.
One No. 2 Fowler Press.
One Crank Planer.
One 400 lb. Drop Hammer.
One Sellers 200 lb. Steam Hammer.
One 600 lb. Drop Hammer.
One Hand Milling Machine.
One "Pond" Index Milling Machine.
Three Chase Patent Pipe Cutting Machines.
One Ames Mfg. Co. 3 Spindle Profiling Machine.
Two Engine Lathes, 11 in. swing, 6 ft. bed.
Two Engine Lathes, 22 in. swing, 8 ft. bed.
One Engine Lathe, 15 in. swing, 8 ft. bed.
One Engine Lathe, 15 in. swing, 7 ft. bed.
One Engine Lathe, 22 in. swing, 16 ft. bed.
Three Engine Lathes, 20 in. swing, 8 ft. bed.
Two Engine Lathes, 22 in. swing, 8 ft. bed.
Six Turning Lathes, 14 in. swing, 8 ft. bed.
One 36 in. x 12 ft. Planer.
One 36 in. x 12 ft. Planer.
One Gear Cutter.
One new "Hardway" Bolt Heading Machine, to head up to 1½ in. bolts.
One new "Hardway" Bolt Heading Machine to head up to 1½ in. bolts.
A lot of Wood Working Machinery.
Please specify which of the above tools you want and we will forward all particulars.
The above tools will be sold very low, and can be seen at

The George Place Machinery Agency, 121 Chambers and 103 Reade Sts., N. Y.

For Sale,

A SET OF ECCENTRIC DIE ROLLS,

with bed plate, housings and gearing all complete, in first-class order.

HENRY DISSTON & SONS, Philadelphia, Pa.

Splendid Chance for Investment.

Stove and House Furnishing Business FOR SALE, doing a large trade, established ten years, very best location in one of the largest cities of Michigan. Stock in excellent condition. No better chance for a good investment in this line in the whole country. Poor health of owner reason for selling. Address GEO. H. BARBOUR, Secretary Michigan Store Company, Detroit, Mich.

For Sale,

A well-selected stock of Hardware, in one of the most thriving county seats in Ohio. Stock all first-class and in splendid order. Stock not large, but very complete. This is a rare opportunity. Terms easy. For particulars, &c., address No. 439 Superior St., CLEVELAND, OHIO.

WANTED.—A SITUATION BY AN EXPERIENCED Hardware Salesman who has traveled ten years in New England. Good references. Address J. H., Office of The Iron Age, 53 Reade St., New York

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desirous of a position. References satisfactory. Address, IRON AND STEEL, Care of P. O. Box 813, Bridgeport, Conn.

Special Notices.

JENNINGS'S

COMBINATION DISCOUNT TABLES.

(Published by the author.)

This Book contains 1500 tables for single and combination discounts, such as 17½%, 45%, 100%, 12½%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%, 100%, &c., which are so arranged as to be found without loss of time, and by their use either the Discount or Net on any amount of dollars and cents, from a penny to one million dollars, can be ascertained in a few seconds entirely by Addition. Just the thing for making or proving invoices, finding Net Value of goods bought or sold, and comparing different Discounts, thereby saving time, blunders and Headwork.

(A copy can be examined in "The Iron Age" Exhibit at the Paris Exposition.)

OPINIONS.

TOLEDO, O., April 15, 1878.
Mr. S. H. Jennings: DEAR SIR—Your Discount Tables are received and I think are all you claim for them, and that they will be appreciated by the trade. I have had inquiries from customers for something of the kind, and shall be pleased hereafter to recommend your book. Yours, very truly, W. ROOT, with The Russell & Erwin Mfg. Co.

MILLDALE, CONN., March 20, 1878.
We consider it a great help, and a book which every business house should possess. CLARK BROS. & CO.

HOUSTON, TEXAS, April 8, 1878.
We find it saves a great deal of figuring. DECHAUMES & DUNN.

HOT SPRING, ARK., April 10, 1878.
We find the Tables correct, and are highly pleased with it. Every merchant should have one of them. FONES BROS. & CO., Hardware Merchants.

It will be mailed, postpaid, to any address, on receipt of the price, \$3. Currency may be sent by mail at my risk. Address S. H. JENNINGS, Deep River, Conn.

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us from London to the 25th ult. to the following effect: "Telegrams from Chili announce small charters, and this has caused more firmness; but English can still be had without difficulty at £63 for Tough Ingots, £69 for Best Selected and £72 for Sheets." With moderate demand the combination prices of Manufactured Copper remain as last quoted. There is scarcely any inquiry for English Yellow Sheathing Metal, and the price is nominally 14¢, currency, in bond. American is somewhat irregular, and quoted at 18¢ @ 20¢, although some sales are understood to have been made under the inside price. We quote: New Sheathing Copper, 26¢; Braziers', 28¢, and Bolts, 28¢; American Yellow Sheathing Metal, 18¢ @ 20¢; Yellow Metal Bolts, 25¢, and English Yellow Sheathing Metal, 14¢, currency, in bond.

Tin.—There is no change in price since our last. We quote large lines, in gold, as follows: Straits, 14½¢ @ 14½¢; English Refined, 14½¢ @ 14½¢; ditto Common, 14½¢ @ 14½¢; and Banca, 17½¢ @ 17½¢. About 2000 slabs were sold here last month at 14½¢, gold, July delivery. Further parcels are offered at the same price, but find no buyers. The Singapore market is unchanged, but London cables £63. The shipments from the Straits to the United States in May have been ample—say, 450 tons. Australia continues to send large quantities. The May shipments thence to England were 1000 tons. The stock in London on the 1st inst. (as per cable) was 9800 tons, an increase of 600 tons since May 1st. The deliveries in England and Holland in May, the cable further informs us, have been 1900 tons. There are afloat for the United States from the Straits settlements to-day some 15,000 slabs. Tin Plates evince great firmness, and a fair amount of business is transacting all along. As per cablegrams from Wales, the market there is irregular, some needy makers accepting lower figures, while the financially independent ones only sell at higher ones, as the case may be. We quote at the close in gold, per box, ordinary brands, large lines as follows: Charcoal Bright, \$6.12½ @ \$6.25; Charcoal Ternes, \$5.62½ @ \$5.75; Coke Tin, \$5 @ \$5.25, and Coke Ternes, \$4.87½ @ \$5. From Liverpool we receive the following, dated May 23: "Last Friday it was announced that the makers' combination to reduce production was accomplished. Since, however, it appears there are some formalities to be gone through, which cause uncertainty. There has been, however, a decided improvement in tone, and in some cases an advance of 1/10 per box is asked, but so far has not been paid. Other makers are holding off from quoting, being pretty well booked. We quote: Charcoal Tins, 17/6 @ 19/; Ternes, 16/3 @ 16/9; Coke Tins, 15/; Ternes, 14/3."

Lead.—Some smaller sales of Newark Lead have been made at 3.20¢, currency; for larger lots of Common Domestic it would not be easy to get 3½¢, currency, at the present moment. Inquiries have been made from Europe whether Common American Lead can be had at 3¢, currency, but as a negative answer had to be wired, nothing further has been heard. At all events, this is a sign that our low prices begin to attract attention on the other side. The next question will be whether prices in Europe would not be most unfavorably affected should shipments hence be made with some prospect of continuity. We should not trouble ourselves much about this contingency. The consumption of Lead in Europe is very large, and the 10,000 tons which we may possibly ship thither between July 1 and January 1 will in reality make little difference whether they come from there or from Spain, where there is a temporarily diminished output. At first the impression may not be a favorable one, but they will soon reconcile themselves to a certain amount of annual supply from here, and the sooner they do so the better, for Lead is destined to become a great export article of ours. Whoever has followed developments in Lead production in this country ought to be satisfied on the subject by this time. We receive the following from England by the last mail: "The depression in Lead continues, and we quote good soft English Pig, £16. 15/; Sheet, £18. 5/; Pipe, £18. 10/; less 3½¢ free on board; soft Spanish, without silver, £16. 10/; less 2½¢ ex quay." Manufactured is taken to a moderate extent at the combination prices, which are slightly lower. We quote: Bar, 4½¢; Pipe, 5¢; Sheet, 6¢; Tin-lined Pipe, 15¢; No. 1 Solder, 8½¢; all less 10¢ to the trade.

Spelter and Zinc.—But a moderate business is transacting in this metal, which we quote 4½¢ @ 5¢, currency, for Common Domestic Spelter. Nothing of special interest has been received about it from Europe, except that it lacks strength on the Continent since the late fresh decline in England. Sheet Zinc.—There is a moderate demand for Sheet, but trade remains rather dull and prices more or less nominal. We quote: Mosselmann, 7½¢ @ 7½¢, gold, and Domestic, 6½¢ @ 6½¢, currency.

Nickel.—As per late mail accounts from England, this metal has now become quite steady there, and so it is here, where we quote it as heretofore, \$1.30, currency, 1¢ lb.

Antimony.—Cookson is scarce, but inactive at 13¢, gold; Hallett and others, 12½¢, gold. The quotation for best at London is £51.

OLD METALS, PAPER STOCK, ETC.

Business in this market is still laboring under a season of dullness. There is no demand for any class of stocks, and prices are still declining.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy.....	per lb. \$0.12½ @
Copper Bottoms.....	" " 10¢ @
Yellow Metal.....	" " 10¢ @
Brass, heavy.....	" " 10¢ @
Brass, light.....	" " 10¢ @
Composition, heavy.....	" " 11½¢ @
Lead, solid.....	" " 10¢ @
Tea Lead.....	" " 10¢ @
Zinc.....	" " 10¢ @
Pewter, No. 1.....	" " 10¢ @
Pewter, No. 2.....	" " 10¢ @
Wrought Iron.....	prton \$16.00 @
Light do.....	" " 9.00 @
Stove Plate.....	" " 9.00 @
Machinery do.....	" " 10.00 @
Grate Bars.....	" " 3.50 @

The prices current for Rags, &c., are as follows:

Canvas, Linen.....	per lb. 3 c. @ 3½¢
Cotton, No. 1.....	" " 3 c. @ 3½¢
White, No. 1.....	" " 4½¢ @
No. 2.....	" " 2½¢ @
Seconds.....	" " 2 c. @
Mixed, Woolen.....	" " 5½¢ @ 6 c.
Soft, do.....	" " 3 c. @
Gunny bagging.....	" " 2½¢ @
Jute butts.....	" " 3 c. @
Kentucky bagging.....	" " 2½¢ @
Book Stock.....	" " 2½¢ @
Newspaper Stock.....	" " 1½¢ @ 1½¢
Waste Paper and Scraps.....	" " 1 c. @
Kentucky Bale Rope.....	" " 4 c. @
Oakum, No. 1.....	" " 3 c. @
No. 2.....	" " 3 c. @
Tarred Shaking.....	" " 1 c. @ 1½¢
Grass Rope.....	" " 2½¢ @

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending June 4, 1878.

Quant. Value.	Quant. Value.
Arms, cs.....	\$875
Hdw., cs.....	140 4,493
Spelter, slabs, 1758	5,400
Mach'y, cs.....	55 5,591
Wringers, bxs.....	3 320
Lea. belt, cs.....	2 565
Ag. imp. pkgs.....	156 8,995
Copper, bbls.....	10 10,000
Sew. mach., cs.....	514 5,093
C'ge mtl. pks.....	5 105
Mf. iron, pks.....	58 601
Mach'y, cs.....	8 435
Hdw., cs.....	23 804
Copper, clks.....	9 1,995
Belting, bales.....	2 200
Ag. imp. pkgs.....	213 6,765

Quant. Value.	Quant. Value.
Revolvers, bz.....	1 100
Hdw., cs.....	27 250
Nails, kegs.....	15 44

Quant. Value.	Quant. Value.
C'ge mtl. pks.....	48 240
Mach'y, cs.....	5 300

Quant. Value.	Quant. Value.
Ag. imp. pkgs.....	358 13,575
Belting, cs.....	2 435
Pt'd ware, cs.....	2 209
Mach'y, cs.....	16 3,190
Guns, cs.....	2 1,286
Sew. mach., cs.....	10 650
Pistols, cs.....	3 2,800
Hdw., cs.....	170 6,693
R.R. br'k's, bz.....	50 1,000
Pumps, pkgs.....	3 125
Brass g'ds, cs.....	1 75
Mf. iron, cs.....	13 1,037
Refrigerators.....	14 375
Cutlery, case.....	1 45

Quant. Value.	Quant. Value.
Ag. imp. pkgs.....	86 3,310
Hdw., cs.....	13 250
Iron rolls, cs.....	1 140
Mach'y, cs.....	9 2,930

Quant. Value.	Quant. Value.
Coal, tons.....	360 1,250
Tin, pks.....	160 1,207
Mf. iron, pks.....	4 117

Quant. Value.	Quant. Value.
Mf. iron, pks.....	44 1,895
Hdw., cs.....	47 1,910

Quant. Value.	Quant. Value.
Sew. mach., cs.....	2 35
Nails, kegs.....	40 121
Hdw., cs.....	26 400
Tinware, cs.....	6 91
Pumps, pkgs.....	4 56

Quant. Value.	Quant. Value.
Hdw., cs.....	421 8,737
Ag. imp. pkgs.....	432 11,960
Wringers, pgs.....	5 114
Mach'y, cs.....	61 1,927
Mf. iron, pks.....	35 1,185
C'ge mtl. pks.....	117 3,722
Pumps.....	7 488
Pt'd ware, cs.....	13 1,560
Saws, cs.....	5 339
Sew. mach., cs.....	42 3,000
Tinware, cs.....	7 180

Quant. Value.	Quant. Value.
Hdw., cs.....	19 244
Lamps, pkgs.....	6 58
Sew. mach., cs.....	3 63

Quant. Value.	Quant. Value.
Copper, bbls.....	192 41,000
Ag. imp. pkgs.....	1281 35,662

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending June 4, 1878:

Quant. Value.	Quant. Value.
Arms, cs.....	50
Curtis R. J.....	30
Nails, kgs.....	30
Fraser P. A. & Co.....	2
Mdse., pkgs.....	2
Fraser & Co.....	2
Mdse., pkgs.....	2
Hecht Bros.....	2
Cases.....	1
Himback S. D.....	1
Anvils.....	170
Planque de Swaites.....	3
Cases.....	3
Remington E. & Sons.....	1
Arms, pks.....	1
Schovring & Daly.....	1
Mdse., pkgs.....	1
Wallach A. & E.....	1
Cases.....	1
Wiebush & Hilger Hard- ware Co.....	1
Cutlery and hdw.....	15
Order.....	3
Packages.....	3

Quant. Value.	Quant. Value.
Brockner & Evans.....	1
Wire netting, rolls.....	327
Curtis R. J.....	713
Bundles.....	320
Goddard & Bros.....	100
Boxes.....	100
Lang W. Bailey.....	270
Bars.....	270
Bundles.....	20
Perkins, Livingstone & Post.....	200
Cast, tons.....	200
Order.....	426
Spiegel, tons.....	50
Buton Iron, bxs.....	50

Quant. Value.	Quant. Value.
Curtis R. J.....	148
Bundles.....	148

COAL.

There is a pretty general feeling in the trade that a mistake was made by the managers of the combination in making the apportionment for June so large. The May quota would have been comfortably taken

and the prices would have probably been moderately well sustained. An advance in prices was, however, determined upon, and a slight stiffening of the market at the same time seems to have influenced the Board of Control to increase the quantity to be mined. The market is quiet since the slight improvement caused by the sale. Many dealers here are busy with their shipments, but have no orders. The general rise in the stock market and the report of higher prices in Coal have carried the Coal stocks up somewhat and caused a more hopeful feeling on the part of some dealers. Circular prices, however, are not to be obtained and are generally shaded. Customers seem in no haste to buy, the general remark being that there will be no difficulty in getting Coal even if the price should advance, and it is better to wait. There is still a good deal of Coal on hand, which has much to do with the indifference of buyers. In spite of the fact that the mines are working only half time, there seems to be an abundance of Coal in the market. The Lehigh steam Coals are, however, somewhat short in supply, as they have been for some time past. The more liberal apportionment for June will probably remedy this. Below we give some of the printed quotations from different companies and dealers. The reader can take them for what they are worth.

Philadelphia and Reading Coal and Iron Company, at Philadelphia:

Lump	St'm'r	Bro.	Egg.	Sto.	Ch't.
Hard White Ash.....	\$3.30	\$3.30	\$3.45	\$3.75	\$3.25
Free-burning W.A.....	3.25	3.40	3.75	3.75	3.45
N. Franklin W.Ash.....	3.25	3.40	3.75	3.75	3.45
Shamokin.....	3.50	3.75	3.75	3.75	3.45
Phillykill Red Ash.....	3.50	3.75	3.75	3.75	3.45
Lorberry.....	3.70	3.75	3.75	3.75	3.45
Lykens Valley.....	3.70	3.85	3.85	3.85	3.45

Lehigh Valley Coal Co., Coal delivered on board of vessels at Perth Amboy, N. J.:

Lp.	St'r.	Bro.	Egg.	Sto.	Ch't.
Spring Mountain.....	\$4.00	\$4.00	\$4.75	\$3.90	\$3.45
Lehigh.....	4.00	4.00	4.75	3.90	3.45
Spring Brook Lehigh.....	4.00	4.00	4.75	3.90	3.45
Highland Lehigh.....	4.00	4.00	4.75	3.90	3.45
Phillykill Coal.....	4.00	4.00	4.75	3.90	3.45
Co's (Lehigh).....	4.00	4.00	4.75	3.90	3.45
Wyoming.....	3.75	3.50	3.50	3.60	3.90
Franklin (Wilkes- barre).....	3.50	3.60	3.90	3.90	3.45

Delaware and Hudson Canal Co., Lackawanna f. o. b. at Rondout. (The towing from New York harbor to Rondout and return at the expense of this company.)

Furnace Lump	Steamer Lump	Egg	Sto.	Ch't.
.....	3.60	3.60	3.60
.....	3.60	3.60	3.60
.....	3.60	3.60	3.60
.....	3.60	3.60	3.60

William H. Meeker, 111 Broadway—Coal deliverable on board vessels at Hoboken, N. J.

Lp.	St'r.	Bro.	Egg.	Sto.	Ch't.
Lack. Valley.....	\$3.50	\$3.50	\$3.60	\$3.75	\$3.40
Kingston.....	3.50	3.50	3.60	3.75	3.40
Ch'y. R. Ash.....	3.50	3.50	3.60	3.75	3.40
Wilkesbarre.....	3.50	3.50	3.60	3.75	3.40
B. B. Lehigh.....	4.45	3.90	3.90	4.10	3.50

Pennsylvania Coal Co.—Coal at Newburgh.

Lp.	St'r.	Bro.	Egg.	Sto.	Ch't.
Scranton.....	\$3.60	\$3.60	\$3.60	\$3.70	\$4.00
Wilkesbarre.....	3.60	3.60	3.60	3.70	4.00
Wyoming.....	3.60	3.60	3.60	3.70	4.00
Brookside, Lykens.....	3.90	3.90	3.90	4.10	4.10
Valley.....	3.70	3.85	3.85	3.85	3.85

These quotations are sufficient to show what the companies and dealers are asking.

Mr. F. E. Seward, of the Coal Trade Journal, gives us the following figures covering the total production of Anthracite Coal in each of the last five years:

In 1873.....	21,263,220	In 1876.....	18,535,557
In 1874.....	20,178,613	In 1877.....	20,847,681
In 1875.....	19,725,471		

The production in the first six months of the years named below has been:

In 1873.....	9,847,380	In 1876.....	7,028,460
In 1874.....	9,344,519	In 1877.....	9,875,919
In 1875.....	6,170,569	In 1878.....	7,000,000

In the early part of 1875 the Schuylkill, Lehigh and part of the Wyoming regions were on a strike for nearly six months, and in 1876 the demand was seriously curtailed by the anticipated disruption of the combination, so that the two years of 1875 and 1876 may be considered as exceptional. The total shipments of the last six months of each of the last five years have been:

For 1873.....	11,435,840	For 1876.....	11,507,097
For 1874.....	10,634,092	For 1877.....	10,971,762
For 1875.....	13,554,908		

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St. PHILADELPHIA, June 4, 1878.

Apart from the extreme depression in the Pig Iron trade, there seems to be in many quarters indications of a considerable improvement. The recent sales of Iron steamships has led to great activity in several yards, and we hear on good authority that in addition to the work going on at Cramp's, at least two other firms are about commencing work on other vessels of a similar class to those recently sold. The details for obvious reasons cannot be given, but there is every prospect of an active trade in this department during the summer months.

In locomotive building there is a steady business doing, the Baldwin Locomotive Works having received orders for 11 during the past few days. Eight of these are for the Atchison, Topeka and Santa Fe Railway, and three for the Terre Haute and St. Louis Company. The Dickinson Manufacturing Company at Scranton have also just commenced work on six locomotives, and there are inquiries which indicate that further orders will be on the market at an early date. There is also a good demand for tires, the Standard Steel Works having just received a considerable order from the Pacific coast, with a very satisfactory amount of business already on hand. There also seems to be a revival in railway build-

ing; work which was suspended on roads several years ago is again being taken up, and in the aggregate there is a considerable development of business which may in a short time have an important influence in other directions.

Pig Iron.—There is no change to note in the general condition of the market, which is about as dull and unsatisfactory as it can be. There is still a good deal of Iron being crowded on the market, but unless actually in need of stock buyers show no disposition to purchase. As we remarked last week, the downward tendency seems to have been slightly checked, simply for the reason that low prices fail to bring any appreciable increase in the volume of business, so that sellers, although as anxious as ever for a market, are disposed to wait further developments rather than force their products on a market which is utterly inanimate. We do not hear of any sales of large lots, but there has been a more active movement in lots of 20 tons up to 100 tons each, at prices varying from \$18 @ \$19.50 for best selected qualities of Soft No. 1 Foundry Irons. There is no doubt, however, that for good sized lots of ordinary brands, \$17.50 @ \$18 would more nearly represent the market, and in the case of prompt cash these figures would be still further shaded by companies who are in need of money. The immediate outlook is most discouraging, as it is conceded that even the best companies at the present time are not able to realize first cost, while many are doing business upon terms which are simply disastrous. There is, however, a pretty general impression among the Iron trade, that the end is not far distant. It is believed that this ruinous competition will result in a reduced production on the one hand, while on the other there are indications of returning prosperity which can scarcely fail to effect the Iron trade, and possibly sooner than one would care to predict. It is believed that the cost of production cannot be reduced, as the market price of Iron is already below that point; some improvement may surely be hoped for, although in the meantime the condition of the trade is deplorable. We quote the market feverish and unsettled at \$17.50 @ \$18.50 for No. 1 Foundry; \$16.50 @ \$17 for No. 2 do., and \$15 @ \$16.50 for Gray Forge.

Ores.—The demand is light, and no sales of importance have transpired. We quote Magnetic Iron Ores at \$2.50, f. o. b. at Hacklebarney mines, for "Blue" Ore, hand broken and selected. "Red" Ore, price \$2.75 f. o. b. cars.

Blooms.—There is no change to note, prices are weak, and transactions chiefly at about \$1 to \$2 below quoted rates, which may be considered almost nominal. We quote: Sunken Scrap Blooms (2464 lb.) \$42 @ \$45; Northern Ore Blooms (2240 lb.) \$37 @ \$39; best quality Charcoal Billets (2240 lb.) for wire and steel purposes, \$50 @ \$55; Bars do. \$65 @ \$67.50; Sheet Iron Blooms, cornered (2464 lb.), \$58 @ \$60; Cold-blast Charcoal Plate Blooms, \$53 @ \$55; run-out Anthracite, \$50 @ \$52.50.

Muck Bars.—There is considerable inquiry for Muck Bar, but we hear of no sales except small lots. Sellers ask equal to \$30 @ \$35, Philadelphia delivery, according to quality.

Structural Iron.—Since date of our last report we do not hear of any important contracts being closed, although there are several orders in the market which will probably be placed in course of the week. The demand is chiefly for bridge work, which is likely to continue active, as the leading railways are availing themselves of increased earnings to put their roads in good condition. The low price at which the work can now be done is also a special inducement, and unless some unforeseen contingency arises to affect railway interests, a large demand for railway equipments seems assured. We continue our former quotations, although in sympathy with the market generally prices have been slightly shaded. We quote: Angles, 2.25¢ @ 2.50¢; Tees, 2.50¢; Beams, 2.75¢ @ 2.85¢; Channels, 2.75¢ @ 2.85¢.

Plate and Tank Iron.—There has been a larger movement during the past few days and sales, have been made to a very fair extent. Some 600 tons have been closed for shipbuilding purposes, and probably an equal amount in smaller lots for general purposes. The mills are fairly employed, with prospects of full work during the current month, but prices are still very unremunerative. We continue our late quotations, but we hear of several transactions at lower prices than our inside figures. We quote: Common Plates, 2.25¢ @ 2.35¢; Tank Iron, 2.35¢ @ 2.55¢; C. No. 1, 2.45¢ @ 2.65¢; Shell Iron,

I venture to say, the very sincere desire of many a long-suffering and patient British ironmaster.

YOUR TARIFF BILL

has almost ceased to attract more than the most casual attention here, the majority of people having pretty well made up their minds that the measure will be lost, or, if it passes, that it will only do so in a maimed and mutilated shape. The subject of American competition, however, continues to be written about in the newspapers and the leading trade journals. Among others the *Ironmonger* (now published weekly) this week has an editorial setting forth statistics anent your export progress, and exhorting the Britishers to stir themselves up and by adopting or using various specified resources meet you "squarely face to face."

BELGIAN COMPETITION

is also dealt with in the same quarter, in relation to the statistics recently furnished by the Belgian government. The Foreign Office have received a report of Belgic progress from M. J. Saville Lumley, who is attached to our embassy at Brussels, in the course of which that gentleman appears to be of opinion that the marked metallurgical progress of that nation is in great part owing to the long working hours and the vigorous manner in which strikes are repressed by the civic and military authorities.

SCOTCH PIG IRON

has further declined in price during the week, both as regards warrants and makers' brands. Shipments to date still show a decline for the year, and stocks are proportionately heavier both in warehouses (174,827 tons) and makers' yards.

Writing from Glasgow May 28, James Watson & Co. reported: "The Scotch pig iron market has been depressed this week with a restricted business doing. The market opened this week firm at 40/6, advanced to 40/7 1/2, cash, and 40/9 one month, closing sellers on Monday afternoon at 40/6 1/2 per ton. On Tuesday the price declined from 40/6 to 40/4 1/2, a fair business having been transacted. On Wednesday it further dropped from 40/4 1/2 to 40/3, cash, and yesterday as low as 40/1 1/2 was accepted, improving however in the afternoon to 40/2 1/2 per ton. To-day the market opened firmer, business being done at 40/3 and 40/3 1/2, cash, closing quietly in the afternoon at 40/3 per ton. Shipments last week were 9348 tons, against 12,392 tons in the corresponding week of 1877." We quote:

G. M. B., at Glasgow	No. 1.	No. 3.
Gartsherrrie, "	49/9	48/6
Coltress, "	57/6	56/9
Summerlee, "	57/6	56/9
Langloan, "	58/6	57/9
Carnbroe, "	51/6	50/9
Calder, at Fort Dundas, "	56/6	49/9
tiengarnock, at Ardrossan, "	56/6	51/6
Leggion, "	50/6	49/6
Darmellington, "	50/6	49/6
quotte, at Leith, "	58/6	55/6
Kinnell, at Bonness, "	54/6	51/6

Shipments from the Clyde are on an average scale, and last week included: From Glasgow—Calcutta—2 tons malleable iron tubes, £21; 5 1/2 tons rivets, £62; machinery, £25; 6 1/2 tons iron castings, £708; sewing machines, £98. Quebec and Montreal—22 1/2 tons boiler plates, £192; 20 1/2 tons wrought-iron boiler tubes, £361; machinery, £218; 28 1/2 tons malleable iron, £179; 97 tons bar iron, £618; 3 1/2 ton sheet iron, £9; 11 1/2 tons iron castings, £105. Rouen—Machinery, £370; sewing machines, £335; 10 1/2 tons wrought-iron tubes, £205. Barbice—Sugar-making machinery, £925; 3 1/2 ton bar iron, £10. Brisbane—2 1/2 tons iron castings, £1112; sewing machines, £72; 9 tons galvanized iron, £173; 24 tons wrought-iron tubes, £200; 15 tons bar and plate iron, £250. Huelva—41 tons bar iron, £335; 30 1/2 tons sheet iron, £246; 2 1/2 tons hoop iron, £35; 5 1/2 tons iron castings, £101; iron and steel manufactures, £15; 13 1/2 tons rivets, £38; 1 1/2 ton wrought iron, £10. Singapore and Penang—Boiler fittings, £220; 11 tons iron castings, £660; anchors and chains, £200; 3 1/2 ton galvanized hoop iron, £15; 10 1/2 tons galvanized iron, £182; 56 1/2 tons bar iron, £3856. Callao—12 1/2 tons castings, £118; steam machinery, £3875. Bordeaux—6 1/2 tons wrought-iron tubes, £130; sewing machines, £1330. Dunkirk—24 1/2 tons wrought-iron tubes, £495; agricultural machinery, £90. Havre—iron castings, £4; 7 1/2 tons wrought-iron tubes, £140. The amount of manufactured iron exported from Glasgow last week was: Bar, 713 1/2 tons; hoop, 3 1/2 tons; malleable, 30 1/2 tons; plate, 27 1/2 tons; sheet, 31 1/2 tons; wrought, 92 1/2 tons. From Greenock—St. Johns, N. F.—Wrought iron, £33; iron pipes, £3; cast iron, £60; galvanized iron, £8. Trinidad—Bar iron, £36; iron hoops, £45; iron wire, £9; iron nails, £18. From Greenmouth—Amsterdam (via Leith)—Sewing machines, £310; 1 1/2 tons cast-iron pipes, £11. Rotterdam—2 tons iron castings, £20.

THE LANCASHIRE RIOTS

of the past week, of which you will have had full details by cable, have excited an exceedingly painful interest throughout the country, and, in a certain sense, some alarm. Those who have but superficially looked into the matter have endeavored to attribute the disturbances to political causes by inferentially arguing that the policy of force has of late usurped the sway of opinion in the councils of the nation. It seems clear to me, however, that the disruption is solely and entirely owing to the long continuance of low wages and short time, and to the fact that the influence of the men has been so thoroughly neutralized by the depressed tendencies of the times. Add to this the fact that there are in all large towns a number of unruly roughs, and we have ample component parts for riotous and disorderly proceedings.

THE SHEFFIELD TRADES

are quiet in respect of iron, steady as to hardware and cutlery, fairly busy as regards Bessemer and rails made thereof, progressing in Siemens steel, and extremely quiet in all branches save one of the ordinary crucible steel industry—the exception being the works where large castings for ordnance are produced. In some little elaboration of this optime I may say that all classes of iron ores and other raw materials are plentiful as to supply and weak in price. The ones used in the locality are, as

heretofore, those from the North Lincolnshire, Mid-Lincolnshire and Northamptonshire fields, in using up which some of the larger smelters of Derbyshire and South Yorkshire mix some of their own local blackband ironstone. This latter stone is getting somewhat attenuated here and there, but there is still a goodly quantity at Butterley, Denby, Thornecliffe, Sheepbridge, Renishaw, Staveley and Elsecar, besides some in the hands of the Fitzwilliam family. The working of the North Lincolnshire district is very largely controlled by South and West Yorkshire houses—such as Dawes, of Elsecar—and those in Mid-Lincolnshire, by Newton, Chambers & Co., of Thornecliffe, Sheffield. In both the Lincolnshire fields matters are quiet, only 11 of 21 furnaces being in blast. Near Sheffield there are a number of furnaces lying idle—at Parkgate and elsewhere. In manufactured iron little is being done. In girders, as is elsewhere the case, the Belgian agents secure almost all the orders for rolled qualities at £2 a ton under our prices, and are frequently successful in competitions for riveted lots. The Bessemer works are in fairly good occupation, mostly on home orders, which run at about £5. 12/6 @ £5. 15/ per ton, free on rail. There is a good call for steel wire of one description or other, partly for cables, colliery winding ropes and telegraphic uses and partly for fencing. I understand that a considerable quantity of this last class is being sent to Canada and the States. There has been no especial change in the file, saw, edge-tool and cutlery branches. Files are selling well for the Continental and home markets; saws for Sweden, Norway, Russia and India; edge tools for the Cape (small lots), India (large), New Zealand, Australia, Peru and Fiji, and cutlery for all these markets as well as to the States, whence saws of the leading manufacturers and merchants are receiving orders of encouraging proportions.

STAFFORDSHIRE AND BIRMINGHAM

have not experienced any great change in the general condition of their leading industries since the date of my last letter. As I have pointed out more than once of late, all the really best iron produced by the principal makers is selling in moderately large bulk, much of it on account of the requirements of the government dock-yards and other national departments, but a goodly proportion also in filling the indents of colonial, home and Continental buyers. These brands, as a matter of course, are unchanged and nominally firm in price, on the basis of £8. 10/ for Bars, but they have little or no influence over the rest of the market, so that quotations are more irregular, in all probability, than at any former period. Individual underselling is a natural outcome of the existing state of things, and lists have apparently degenerated into matters of mere tradition. It is stated that the Shropshire Iron Company have secured government orders for wire; that Earl Granville is about to build two additional blast furnaces at Etruria; that Messrs. Colburn & Sons have blown in another furnace at Tipton, and that Mr. Onions has started the Regent Iron Works at Tipton for the purpose of manufacturing sheets. In the hardware trades there is a promising amount of work in course of execution, much of it for builders' requirements in the home markets, but a fair proportion for the larger colonies, India, the North of Europe, Egypt and South America. At Willenhall, Alexander Lloyd & Sons are running through a government order for stamped saddlery goods. The Staffordshire correspondent of the *Ironmonger* states that Wolverhampton houses are receiving specimen goods from Australian and other storekeepers, accompanied by requests to "imitate" the American labels and the goods themselves, so that the articles may continue to be made, and consequently purchased, in England. The correspondent adds that in some instances the request is being complied with, but in more declined. If this be so, I shall cease to sympathize with British complaints against German piracy of names and trademarks.

SOUTH WALES AND MONMOUTHSHIRE.

These parts of the country are not in a satisfactory condition. Hopes had been excited of the probable resumption of operations at Plymouth and Aberdare, but it is now denied that any such step is likely. Last week's principal shipment of iron from Cardiff was a lot of 100 tons of rails from Rhymney to Sundswall. From Newport 3041 tons of rails were dispatched and 7121 tons of iron ore imported. The tin plate trade remains dull. The Garth Tin Plate and Iron Company of Rhiwderin, Newport, has suspended payment, owing about £70,000, and it is rumored that another firm, owing £15,000, is in difficulties. At Rhymney Works, one pit with two converters made 1128 tons of Bessemer ingots, and would have produced more but for the breakdown of the blowing engine. In a single shift one converter turned out 121 tons. At Dowlais 1300 tons have been made in a week in a single pit.

THE METAL MARKETS

have been very weak all round, with attendant lower prices. The *Ironmonger* reports: "Copper has been weak, with incidental lapses in prices, which are now lower than for 30 years. Chili bars are sold at £60. 15/ @ £61. 10/; Wallaroo, £72; Burma, £70. 10/; English cake and ingot, £67; sheets, £71. The exports are in excess of this time last year, but supplies are very large. There is no hope at present of any rise. At Redworth tributary copper ore realized an average of £3. 14/ per ton. Tin has not improved in price, although there has been a little more business in it. Straits and Australian are quoted £60 @ £60. 10/; Banca, £63; English ingots, £65 @ £65. 10/; English refined, £68. For the first four months of the year the imports of tin have been 123,371 cwt., against 97,055 in 1877; the exports, 37,811 cwt., against 33,478. Lead keeps dull and prices unchanged. English pig is quoted £16. 17/6; W. B., £17. 10/; sheet and bar, £18; Spanish, £16. 10/ @ £16. 12/6. The imports of lead for 1878 to date have been 33,216 tons, against 31,404 in 1877; and the exports, 11,546, against 11,963. Quicksilver has again been in but limited request, at £6. 15/ @ £7

per flask. Spelter rather weaker, remaining at £17. 15/ @ £18. 5/ for Silesian and £21 for English. Zinc for the most part unchanged. At Messrs. Sargent's fortnightly sale on Thursday, 85 tons sold at £20. 7/6 and 15 tons at £20. 10/. Antimony unaltered at £49 @ £49. 10/.

Von Dadelzen & North's circular is similar in tone.

Iron and metals are not materially changed at Liverpool. Messrs. Harrington, Horan & Co. report thence: "About 1000 tons Chili bars sold since our last at £62 down to £60. 10/, since which prices have improved again, and to-day we quote £61. 10/ @ £62 1/2 per ton, according to brand. In furnace material the sales were confined to 150 tons rich Spanish precipitate at 12/3; 30 tons English, 12/4 1/2; and 455 tons Spanish, 11/9 per unit; 329 tons New Quebrada ore, 11/6; 500 tons Cape ore, 11/10; and 125 tons Mexican ore, 12/ per unit. There were no sales of Chili ore or regulus during the fortnight, and the nominal quotations are 11/9 @ 12/ per unit. Chili copper charters for the second half of April were 1800 tons, all bars, of which 300 tons go to the Continent. Quotations are: Chili bars, £61. 10/ @ £62; Chili ingots, £68; Chili ore and regulus, 11/9 to 12/; and Coro Coro Barilla, 13/6. Arrivals here during the fortnight of West Coast South America produce have been: The Iberia, from Valparaiso, 820 bars and 85 ingots; and Magnet, from Carrizal, 745 regulus. At Swansea—Nil. Stocks of copper (Chilian and Bolivian) in first and second hands, likely to be available, we estimate: At Liverpool, 917 regulus and 13,605 bars; Swansea, 2189 ores, 6911 regulus and 2043 bars, making totals of 2189 ores, 7828 regulus and 15,643 bars, representing about 19,609 tons fine copper, against 19,660 tons on the 30th ult., against 15,252 tons do. on May 15, 1877. The stock of Chili copper in Havre is 8688 tons fine, against 9274 tons May 15, 1877; stock of Chili copper afloat and chartered for to date, 9500 tons fine, against 12,000 tons May 15, 1877; and stock of foreign copper in London, chiefly Australian, 6405 tons fine, against 4400 tons May 15, 1877. Tin—Market quiet at £61 for Straits and Australian; £65 for British, and £55 for Peruvian. Lead—Market dull at £17 for ordinary shipping brands. Spelter—Market dull at £18 for ordinary Silesian brands."

Convict Labor.

The Philadelphia *North American* says: The deposition of Capt. Pillsbury from the superintendency of the Albany Penitentiary is undoubtedly a concession to a public clamor against the employment of criminals as producers. And though it may, as a contemporary asserts, measure the growing importance of the class from whom the clamor proceeds, and its influence with political managers, that fact ought not to deter anybody from discussing the matter candidly and fairly. If it can be shown that the employment of persons in duress of imprisonment robs any man of work who is willing to work, this clamor will start with the advantage of a grievance, at least. But that has not yet been shown. In prosperous times very little is heard about the adverse effect of convict labor, yet its effect must be the same upon labor in general whether the times are prosperous or otherwise. So long as there is work enough for all, and wages are fair, the effect of convict labor is not perceptible. Naturally, in such times, only the coarser and low-priced products are turned out by prisons and reformatories, unless it be in special cases. For when work is plenty there is a good market, and a good market means remunerative hire for labor.

But the only candid way to deal with this subject is to assume as existing a social situation in which there are no prisons, and consequently no convicts. Clearly, under such conditions, the mass would be as now, producers, only the number would apparently be much greater. To increase the producing hands without increasing the demand for production, would of course tend to lower market rates. The competition would be so great that the more pushing would fare best, and in a very short time the fall in wages and the inability of many to cope with those stronger would bring about pretty nearly a state of affairs similar to that which rules to-day. And we should hear the same denunciations of cheap labor and the tyranny of capital that we hear now. This brings us to the question. Are we to suppose that the constant isolation of some members of the producing classes in penitentiaries is necessary to insure the thrift of the virtuous and orderly remainder? Could or could not the mass of producers manage to live and thrive were not some thousands of their number annually taken from the field of voluntary labor and shut up in compulsory idleness? If they could manage to live with the entire mass at large, what hinders them from living when, say, 50,000 are shut up in prison, and not more than half that number do anything at all, except to devour their rations?

Now, if it is absolutely necessary to the well-being of the working masses that from 50,000 to 100,000 people should be shut up in prisons and kept in utter idleness all the time, what are we to think of such a state of things? When Malthus first propagated his views on population, the Christian world held up its hands in horror. But if the gentlemen who are rendering the skies with their denunciations of convict labor do not assent to the third Malthusian proposition, what do they mean? Either the penitentiary is a saving institution or it is not. And if it is not, then whether a man makes a pair of shoes inside or outside of its walls can make no difference whatever. But if the penitentiary is a check upon population, to keep it on a level with the means of subsistence, then we can understand the Sineys, the Hugheses and the Wrights, together with their fellow-statemens in the State of New York.

But we should be glad to have them come squarely out and say that it is necessary to reduce the number of producing hands by boarding, clothing and lodging about 100,000 persons at the public expense in genteel idleness. If that is what they mean, why not say so? If it is not what they mean, what do they mean? Probably they do not know

what they mean themselves. But Mr. Malthus knows exactly what he meant, and he said it so plainly that not even the stupidest of these heralds of reform can possibly mistake his meaning. We have purposely omitted to argue the question in its moral aspects—whether work is necessary to the convict or not—because, for the most part, those who cry out against convict labor regard work as a curse, and could not comprehend the argument.

Pennsylvania Communists.

A correspondent of the New York *Times*, writing from Philadelphia, says:

There has been a great deal of uneasiness felt in Pennsylvania concerning an alleged Communist movement and a threatened outbreak of the unemployed working people. When the wild stories from the West were first put into circulation, the authorities here began investigating the strength of the movement at this point. It was found there were numerous lodges of the Knights of Labor who were organized ready for an emergency, but at this time Mayor Stokely states there are not more than 500 members in all the Communist societies in the city. The chief officer of one of the most prominent detective bureaus in the country, whose headquarters are in this city, says that on the line of the railroads between Philadelphia and Pittsburgh there are not less than 15,000 men who stand ready at a moment's notice to begin the disgraceful scenes witnessed last summer. His information comes from the numerous detectives of the agency, who are in the employ of the principal railroad companies in the country. He reports the feeling of the workmen as ripe for another Communist uprising, and that they are organizing under the guise of beneficial societies. Of these associations there are about fifteen, with branches extending to all parts of the State, and creeping into the southern tier of counties of New York. Whether there will be another strike this summer cannot be told yet, but it is certain there are preparations making for it.

Should a riot occur in Pennsylvania at the present time the results would be more disastrous than before, because there is no means of putting it down until volunteers could be called out. The militiamen became so disgusted with the manner in which they were treated last summer during the Pittsburgh troubles that, after they came home, 100 resigned. Within the last week Major Gen. Brinton, of the First Division, his staff and Brig.-Gen. Loud and his staff resigned. Following these officers more men will go out. It is confidently believed that if a call was made to-day for troops from this city not more than 1000 men, if so many, could be mustered. The condition of affairs noted here is the same throughout the State. A bill was passed by the last Legislature to reorganize the militia, but it will require some months to accomplish this. In the meantime the whole body of military in the State is little better than an organized mob. Orders have been issued requiring that rosters be kept at all the armories of the places of residence, and employment of all the members of militia companies, while, if there is a call, they are to provide themselves with rations for three days. Militiamen are also compelled to keep their uniforms and equipments at the armories instead of at home, as heretofore. Notwithstanding statements to the contrary, every preparation is being made to put down an uprising. Mayor Stokely, a few days ago, made a requisition through Gov. Hartranft, upon Secretary of War McCreary for 400 breech-loading rifles. These are to arm the police. The officers drill twice a week in the manual of arms at the military armories, a duty which has not heretofore been imposed upon them. There is scarcely a financial institution of any magnitude here which has not made preparations to resist the attack of the mob. One of the largest has perfect arrangements in this regard, so that the doors could be instantly closed in case of attack, and each clerk has but to throw back a panel in the side of a

desk, where a carbine is kept, so that in less than a minute there would be 50 clerks armed and ready to do duty with seven-shooters. Recent travels through the State show that the sentiment of the workmen is dangerous, and that should the scenes of 1877 recur, they all seem to have their plans laid for a system of pillage, which did not occur to them before.

Decline in the Value of Mill Property.—On Wednesday last the Salisbury Mills were sold at auction in Boston for the sum of \$160,000. The original or total cost of the mills was \$1,200,000, or, in other words, they brought less than one-seventh of their cost, and were bought by Mr. John Gardner, who for many years previously, in their more prosperous days, was their manager. Large numbers of capitalists from New York, Philadelphia and other points attended the sale, the terms of which were cash in 10 days, or \$100,000 on June 15 and balance July 1. The water-power of the mills is among the best in the country, and comprises 3000 acres of reservoirs, controlling all the water in the immediate vicinity, from tide water back to within a distance of ten miles in the interior. The mills are in good repair and can be started up to-morrow without any additional expense. There are 188 tenement houses and 27 stores included in the property sold. During the 13 years the mills were under the care of Mr. Gardner the sales amounted to \$31,000,000, paying commissions of \$800,000 to \$900,000. The profits during this period of time were \$4,341,000, and the dividends paid out \$3,047,500. The old company broke up in 1857, brought to grief by bad management, and came very near failing. The mills were incorporated in 1823, with a capital stock of \$150,000. Two years later a new company was formed, with \$160,000 capital, in shares of \$1000 each. In 1856 the property was sold at auction, and the same year the purchasers created a new company, and received a new charter, with \$500,000 capital. In 1859 the capital stock was increased to \$750,000, and again in 1862 to \$1,000,000, and from that date to 1872 its history had been one of unexampled prosperity. During the period when the selling agency was held by Gardner, Brewer & Co., the commissions of that firm are said to have reached almost \$1,000,000, and the dividends were regular and large. One stockholder received in the aggregate, in dividends, \$300,000 in 1872.—*United States Economist*.

Many of the famous gold and silver mines of this and other countries have been found by accident. The famous Potosi was found by a fugitive slave, escaping from the mountains, grasping a bush; the roots gave way, disclosing the precious metal lying beneath it. Gold was discovered in California by a laborer digging a mill race, and in Australia by a shepherd, who, while guarding his flock, brought the treasure to light by the heel of his boot. The Comstock, which has produced results of such extraordinary magnitude, was discovered by a misanthrope, who, weary of the vicissitudes of a misspent life, and seeking solace in the wilds of the frontier, sat him down to a cold luncheon upon a huge outcropping, and, in a sad soliloquy, began tossing about the loose pieces of quartz above the great bonanzas which have given fortunes to many but only a grave to him. And the Austin mines were found by an overland express rider while hunting a wandering pony on Lander Hill. In the Black Hills there appears to be no settled rule which prospectors or miners accept as worthy of a moment's consideration. "Truck," which in any other mining country would be passed in disdain, is here as respectfully and carefully examined as ordinarily good-looking quartz. No rule, sign, condition or circumstance is here recognized as evidence of quality or perpetuity. Result is the only standard of merit; prospecting and development are purely on faith, and that faith has oftentimes been rewarded with rich returns, though exercised in direct antagonism to science and experience gained on other fields.

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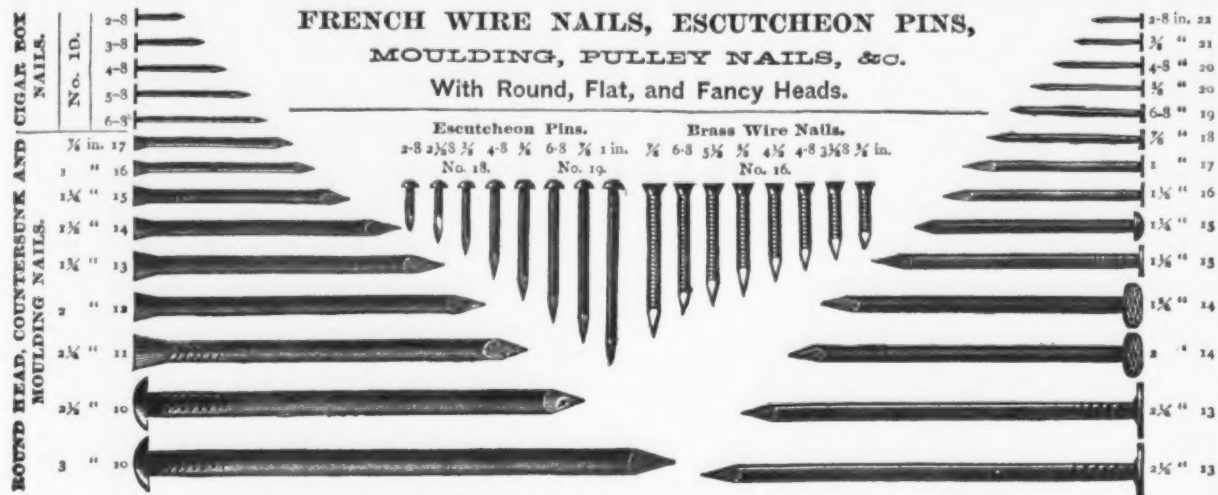
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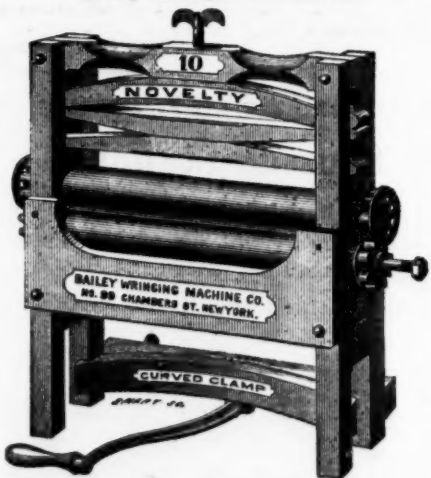
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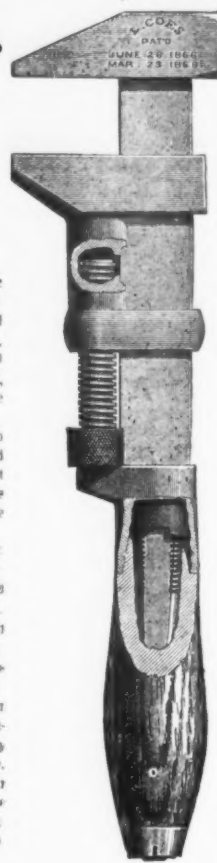
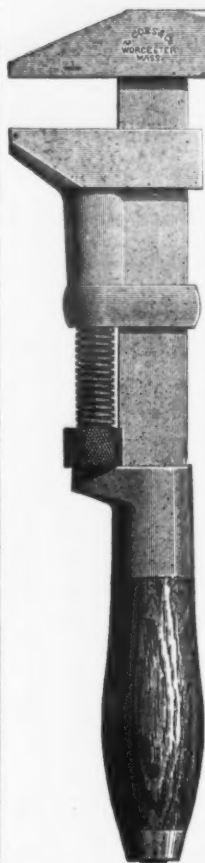
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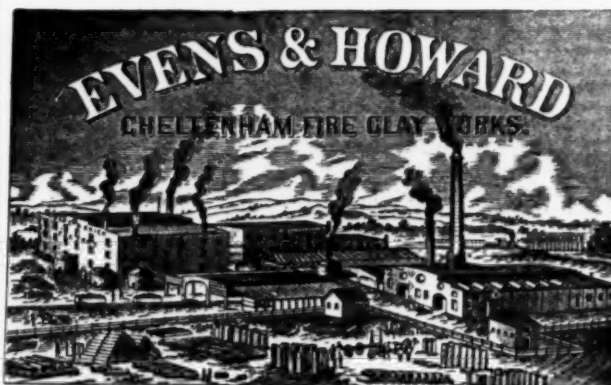
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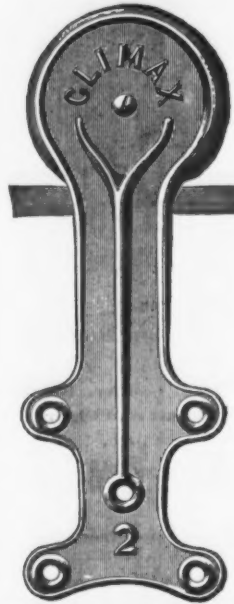
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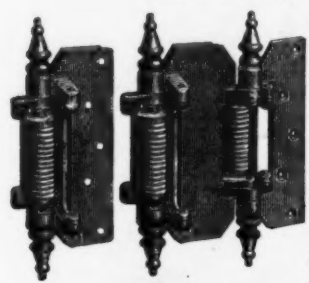
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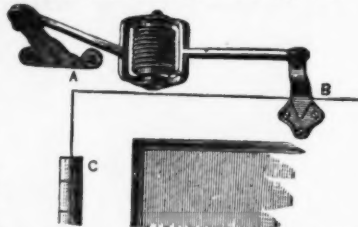
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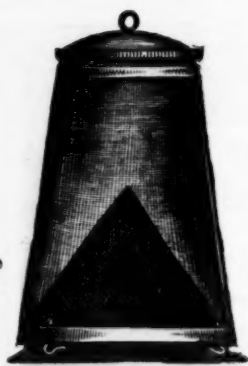
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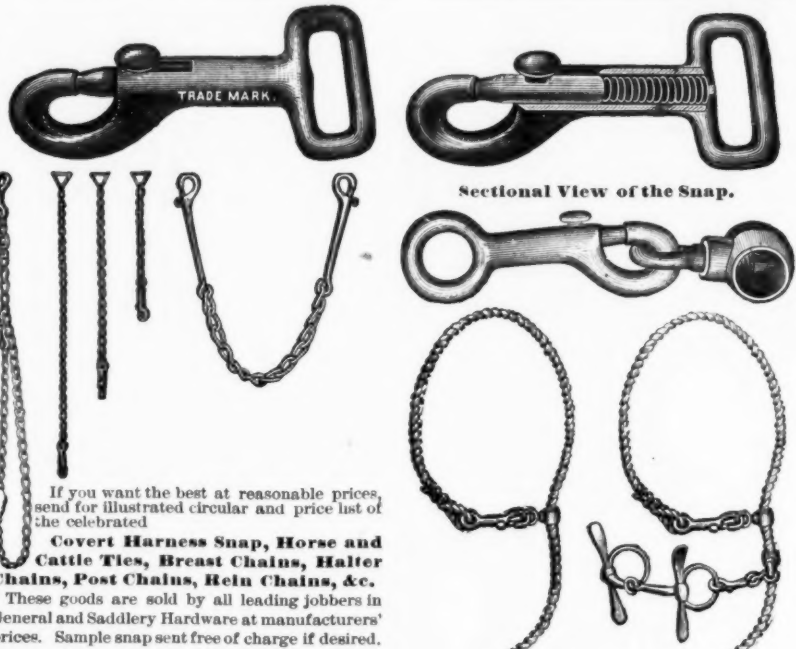
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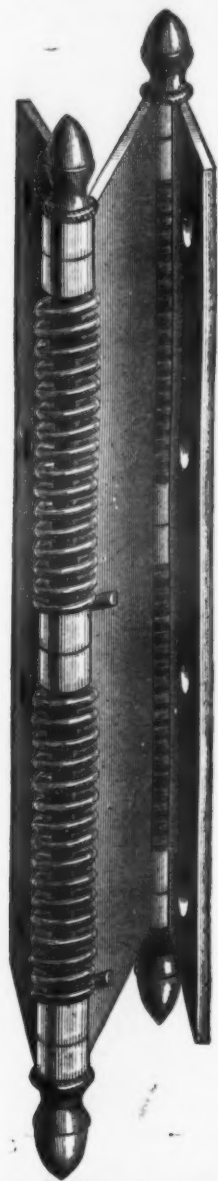
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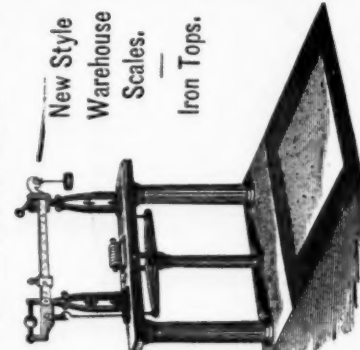
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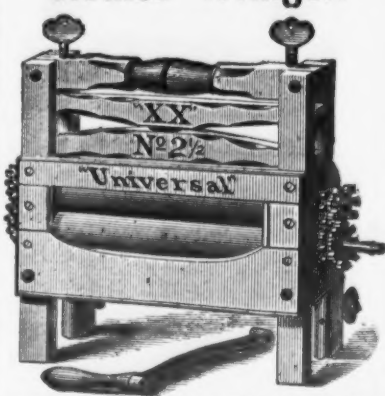
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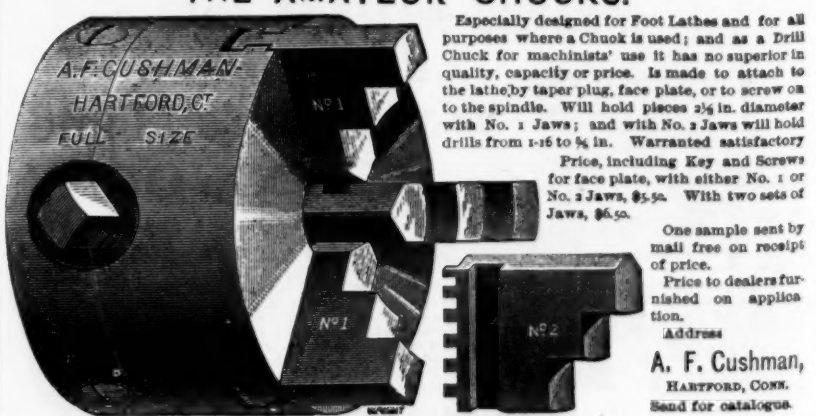
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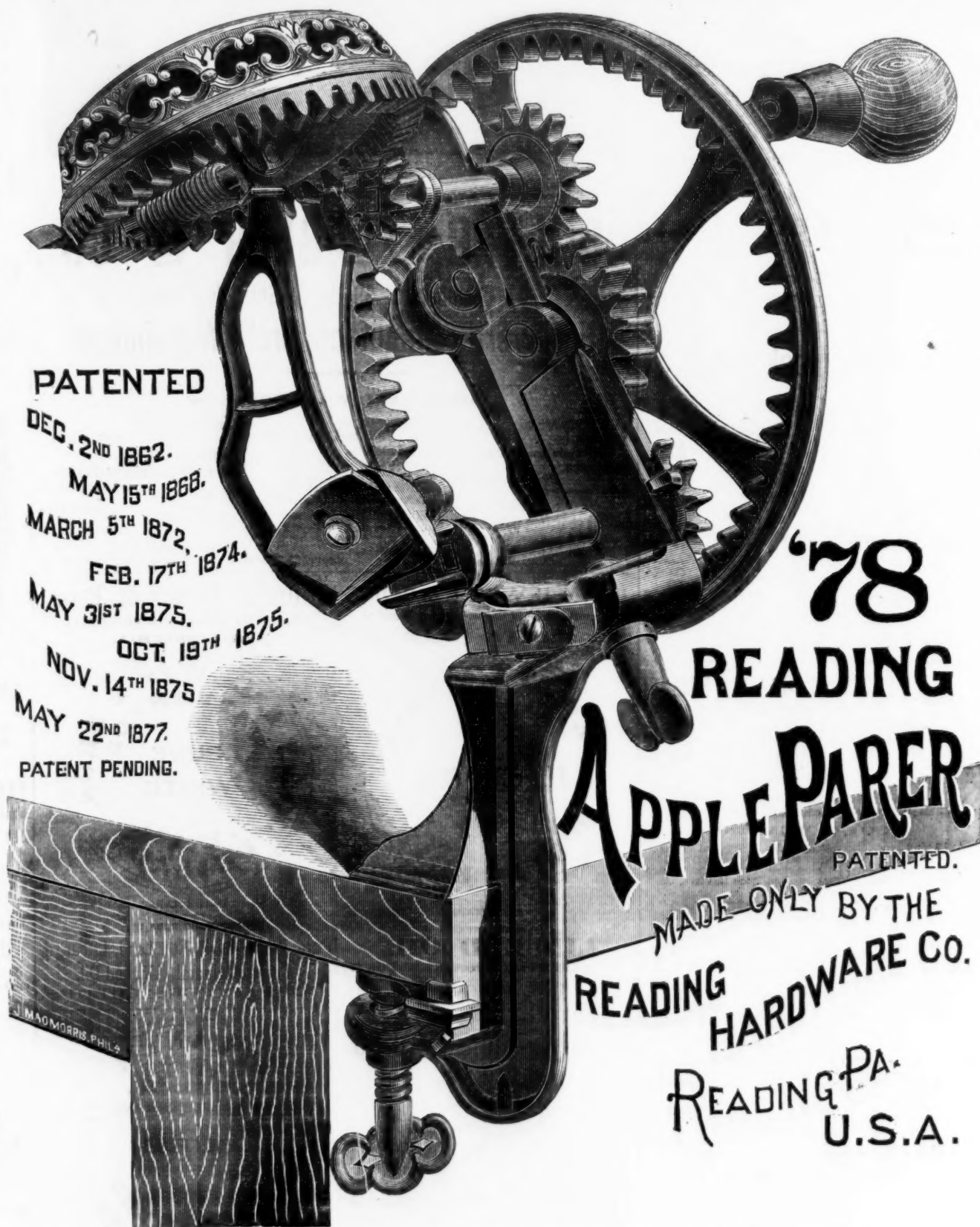
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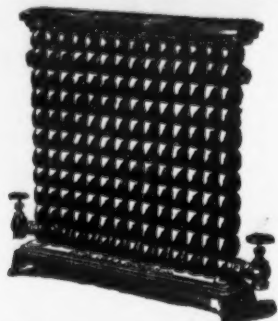
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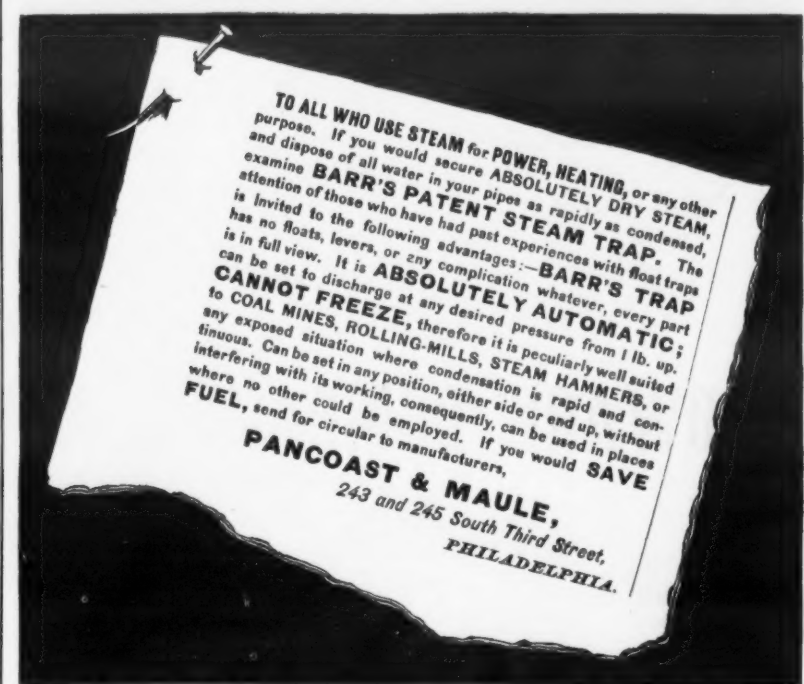
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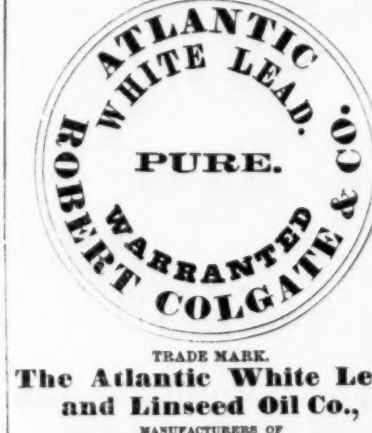
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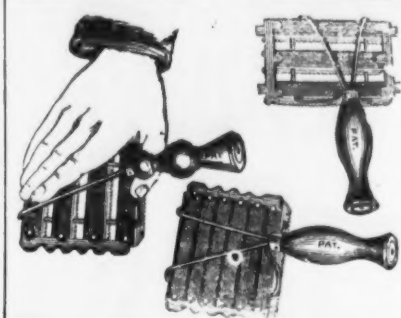
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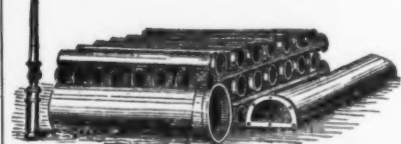
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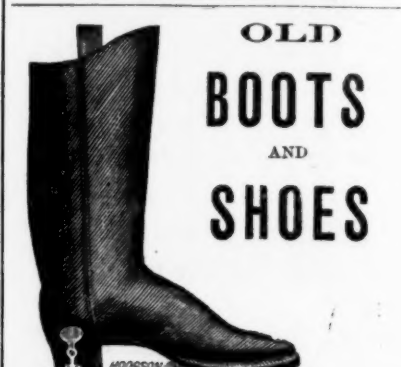
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Brass, Manufacturers of.	
Ansonia Brass and Copper Co., 19 Cliff, N. Y.	2
Bridgeport Brass Co., Bridgeport, Conn.	2
Brass Goods Mfg. Co., 102 John, N. Y.	2
David Jones & Sons, 102 John, N. Y.	2
Hobbs, Booth & Haydens, 43 Chambers, N. Y.	2
Manhattan Brass Co., 30 Rock, N. Y.	2
Miller E. & Co., 102 John, N. Y.	2
Plum & Atwood Mfg. Co., 30 Chambers, N. Y.	2
Seavill Mfg. Co., 40 Broome, N. Y.	2
Waterbury Brass Co., 22 Broadway, N. Y.	2
Brass Foundries.	
Reeves Paul S., Philadelphia	42
Bridge Builders.	
Mosley Iron Bridge and Roof Co., 5 Day, N. Y.	30
Back Saws.	
Boynton E. M., 20 Beekman, N. Y.	42
Butcher and Shoe Knives, Manufacturers of.	
Wilson John, Sheffield, England	41
Butts and Hinges.	
American Spiral Spring Butt Co., 23 Beekman, N. Y.	48
Sabin Mfg. Co., Montpelier, Vt.	48
Sample & Birge Mfg. Co., Springfield, Mass.	48
Stanley Works, New Britain, Conn.	48
Union Mfg. Co., 95 Chambers, N. Y.	7
Butts.	
Victor Sewing Machine Co., Middletown, Conn.	13
Carriage Bolts, Makers of.	
Townsend, Wilson & Hubbard, Philadelphia	12
Carriage Hardware, Makers of.	
Hayden & Smith, Auburn, N. Y.	12
Smith H. D. & Co., Plantville, Conn.	30, 31 & 32
Topitt & Ely, Elvira, O.	30
Carriage Springs.	
Springer Co., Fulton, near Pittsburgh, Pa.	13
Roma Trestle Co. (Limited), Rome, N. Y.	13
Car Axles.	
Roberts A. P. & Co., 25 S. 4th, Philadelphia	9
Chains.	
Reiter & Morton, Pittsburgh, Pa.	9
Chilled Rolls (Hollow).	
Totten & Co., Fulton Foundry, Pittsburgh, Pa.	6
Chisels, Manufacturers of.	
Back Bros., Millbury, Mass.	11
Chocks, Springs, &c.	
Cary & Moon, 24 W. 20th, N. Y.	3
Dunbar Bros., Bristol, Conn.	3
Coal, Miners.	
Pardee A. & Co., 111 Broadway, N. Y.	41
The Hoboken Coal Co., Jersey City, N. J.	41
Coal Vases.	
Sidney Shepard & Co., Buffalo, N. Y.	30
Coiler and Splice Mills.	
Lane Brothers, New York, N. Y.	6
Enterprise Mfg. Co., Philadelphia, Pa.	30
Compasses and Dividers, Manufacturers of.	
Bemis & Callahan, Springfield, Mass.	40
Coopers' Tools, &c., Dealers in.	
D. R. Barton Tool Co., Rochester, N. Y.	30
Little Chas. E., 59 Fulton, N. Y.	29
Copper.	
Pope, Cole & Co., Baltimore, Md.	2
The New Haven Copper Co., 25 Pearl, N. Y.	2
Corn Huskers.	
Chambers, Boring & Quinlan, Decatur, Ill.	29
Corrugated Iron.	
Mosley Iron Bridge and Roof Co., 5 Day, N. Y.	30
Crucibles, Manufacturers of.	
Wile, Sidel & Co., 27 Market, Phila.	43
Cupolas & Blowers.	
Smith & Sayre Mfg. Co., 21 Cortlandt st., N. Y.	46
Curry Combs, Manufacturers of.	
Hazleton D. W. & Co., Philadelphia, Pa.	43
Hotchkiss' Sons, Bridgeport, Conn.	12
Lawrence Curry Comb Co., 382 2d av., N. Y.	34
Cutlery, Importers of.	
Baker Hermann & Co., 101 Duane, N. Y.	41
Clatworthy F. & Y., 41 Chambers, N. Y.	41
Fisher J. S., 41 Commerce, Phila.	41
Friedman & Lauterjung, 14 Warren, N. Y.	11
Cutlery, Manufacturers of.	
Burkhead Aaron, Pupperell, Mass.	11
Goodell Company, Antwerp, N. H.	31
Morison Cutlery Co., 49 Chambers, N. Y.	41
Naugatuck Cutlery Co., 80 Chambers, N. Y.	41
New York Knife Co., Walden, N. Y.	11
The Fray Cutlery & Knife Co., 14 Warren, N. Y.	11
The Lamson & Goodnow Mfg. Co., 80 Chambers, N. Y.	11
Differential, or Hacks.	
Yale Lock Mfg. Co., 33 Chambers, N. Y.	7
Discount Tables.	
Jennings S. H., Deep River, Conn.	24
Door Muzzles.	
Mercereau W. T. & J., 31 Broadway, N. Y.	12
Dunne P. R., 132 Fulton, N. Y.	30
Quackenbush, Townsend & Co., 59 Beekman, N. Y.	48
Van Wagener & Co., 52 Beekman, N. Y.	48
Door Stops and Holders.	
Spangler & Co., Pittsburgh, Pa.	45
Drill Chucks, Manufacturers of.	
Chisham A. F., Hartford, Conn.	45
Lambertville Iron Works, Lambertville, N. J.	44
Drilling Machines, Makers of.	
Bickford H., Cincinnati, O.	44
Thorne, De Haven & Co., Philadelphia	44
Drop Forgings.	
Baker Hermann & Co., 101 and 103 Duane, N. Y.	44
Rose Wm. & Bros., West Philadelphia, Pa.	43
Drop Presses.	
Beecher & Peck, New Haven, Conn.	43
Edge Tools, Makers of.	
T. B. Barton Tool Co., Rochester, N. Y.	30
Doscher M., 4 and 6 Gold, N. Y.	30
Elevators, Makers of.	
Crane Bros. Mfg. Co., Chicago, Ill.	9
Lane & Bodley Co., Cincinnati, O.	42
Mason Volney W. & Co., Providence, R. I.	43
Stokes & Parcell, Philadelphia, Pa.	43
Elevator Buckets.	
River Buckets Co., Chicago, Ill.	30
Rowland F. F., Brooklyn, N. Y.	30
Emery Wheels.	
Rich Valley Emery Wheel Co., Weissport, Pa.	48
Engineers, Machinists, &c.	
Southern States Coal, Iron & Land Co., South Pittsburg, Tenn.	6
Todd Joseph C., Barclay, N. Y.	6
Engines, Marine.	
Brown Caloric Engine Co., 57 Lewis, N. Y.	46
Engines, Locomotive.	
Englewood Locomotive Works, Philadelphia, Pa.	4
Engines, Steam, Makers of.	
Evans Chas. W. & Co., Kensington, Phila.	45
Fitchburg Steam Engine Co., Fitchburg, Mass.	45
Land & F. A. B., Lancaster, Pa.	34
Lovegrove & Co., Philadelphia, Pa.	34
Payne B. W. & Sons, Corning, N. Y.	45

Export Factors.	
Jennings S. H., Deep River, Conn.	24
Faucets, Brass, Makers of.	
McNab & Harlin Mfg. Co., 50 John, N. Y.	34
Faucets, Self-Measuring, Makers of.	
Enterprise Mfg. Co., of Pa., Phila. and N. Y.	35
Felt and Wadding.	
Bacon Chas. N., Winchester, Mass.	23
Files, Importers of.	
Carr J. & Riley, 50 John, N. Y.	40
Fisher Joseph S., 41 Commerce, Phila.	41
Fraser Peter A. & Co., 54 Fulton, N. Y.	8
Moss F. W. & John, N. Y.	8
Sanderson Bros. & Co., 16 Cliff, N. Y.	40
Files, Manufacturers of.	
American File Co., Pawtucket, R. I.	8
Auburn File Works, 30 Chambers, N. Y.	8
Barnett G. & H., 41 and 43 Richmond, Phila.	8
Diaston Henry & Sons, Phila.	8
Draper C. T. & Co., Sing Sing, N. Y.	8
Everhart James M., Scranton, Pa.	48
Johnson & Bros., Newark, N. J.	8
Johnson & Bros., 1 Commercial, Newark, N. J.	8
McCaffrey & Bro., 173 and 174 N. 4th, Phila.	8
McClure Chas. B., Williamsburg, N. Y.	8
Fire Brick, Makers of.	
Borgner & O'Brien, Philadelphia, Pa.	23
Brooklyn Clay Retort and Fire Brick Works, Van Dyke St., Brooklyn, N. Y.	23
Even & Howard, St. Louis, Mo.	23
Gardner, Stuart & Co., Pittsburgh, Pa.	23
Hall A. & Sons, Perth Amboy, N. J.	23
Hall & Sons, Buffalo, N. Y.	23
Maurer Henry, 48 East 23d, N. Y.	23
Kreische B. & Son, 38 Gore, N. Y.	23
Newton & Co., Albany, N. Y.	23
Ostrander James & Son, Troy, N. Y.	23
Valentine M. & Bro., Woodbridge, N. J.	23
Watson John R., Perth Amboy, N. J.	23
Weber Adam, 63 E. 15th, N. Y.	23
Flint and Emery Paper and Cloth.	
Seaver, Adams & Co., 730 Market, Phila.	30
Flower Pot Stands.	
Barnum E. T., Detroit, Mich.	4
Fluting Machines.	
The American Machine Co., Philadelphia	42
Forges, Portable, &c.	
Keystone Portable Forge Co., Philadelphia	30
Fossiliferous Ores.	
Brown T. J., Rockwood, Tenn.	6
Foundry Patterns.	
Paxson J. W. & Co., 114 Beach, Phila.	6
Whitehead Bros., 517 W. 15th, N. Y.	32
France, Makers of.	
Richmond & Potter, 19 S. Fourth, Phila., Pa.	5
Furniture Springs.	
Carey & Moon, 24 W. 20th, N. Y.	3
Galvanized Iron.	
Lefferts Marshall, Jr., 50 Beekman, N. Y.	4
Grain Cradles.	
Grant Fan Mill and Cradle Co., Melrose, Rensselaer Co., N. Y.	48
Grindstones.	
Cooper & Holle, Brooklyn, N. Y.	41
Wilson & Hughes Stone Co., Cleveland, O.	41
Wood H. S. & Co., 38 West, N. Y.	41
Wood & Walter, R. 28a and 28b Front, N. Y.	41
Worthington & Sons, North Amherst, O.	41
Guns, &c.	
Windmiller Louis & Roelker, 30 Beekman, N. Y.	24
Gunpowder, Makers of.	
Kneeland F. I. (Dupont) 70 Wall, N. Y.	40
Laflin & Rand Powder Co., 26 Murray, N. Y.	40
Hardware Commission Merchants.	
Bright Philo S., 100 Chambers, N. Y.	9
Graham & Haines, 117 Chambers, N. Y.	9
Salomon L., 100 Chambers, N. Y.	11
Samuel S. L., 57 Cedar, N. Y.	8
Tenniss & Wilson, 81 Beekman, N. Y.	31
Walbridge G. B. & Co., 83 Beekman, N. Y.	30
Hardware Dealers.	
Brown John L. & Son, 288 Greenwich, N. Y.	35
Lloyd Currier & Walton, 62 Market, Phila.	35
Shepard Sidney & Co., Buffalo, N. Y.	35
Hardware Importers.	
Baker Hermann & Co., 101 Duane, N. Y.	41
King, Briggs & Co., 56 Broadway, N. Y.	41
Van Wart, Son & Co., 134 and 135 Duane, N. Y.	41
Windmiller Louis & Roelker, 30 Beekman, N. Y.	41
Hardware Manufacturers.	
American Spiral Spring Butt Co., 23 Beekman, N. Y.	48
Clark & Co., Buffalo, N. Y.	48
Coulter, Flader & Co., 30 Chambers, N. Y.	48
Covles Hardware Co., Unionville, Conn.	48
Enterprise Mfg. Co., Phila.	48
Hart, Elvira & Mead Mfg. Co., 107 Chambers, N. Y.	10
Lloyd, Sunlight & Walton, 62 Market St., Phila., Pa.	48
Millers Falls Mfg. Co., 74 Chambers, N. Y.	29
Pratt & Co., Buffalo, N. Y.	30
R. Bliss Mfg. Co., Pawtucket, R. I.	48
Russell & Erwin Mfg. Co., New Britain, Conn.	48
Shepard Hardware Co., Buffalo, N. Y.	48
Stanley Works, New Britain, Conn.	48
Union Mfg. Co., 95 Chambers, N. Y.	7
Van Wagener & Williams, 81 Beekman, N. Y.	48
Hardware Specialties.	
Shepard Sidney & Co., Buffalo, N. Y.	35
Spencer & Underhill, 94 Chambers, N. Y.	35
Hardware (Wagon).	
Cover E. & J. C., Farmer Village, N. Y.	12
Harness Snaps.	
Cover Mfg. Co., Troy, N. Y.	31
Hay Knives.	
Holt Hiram & Co., East Wilton, Me.	30
Hinges.	
Lewis, Oliver & Phillips, Pittsburgh, Pa.	12
Seavill Mfg. Co., 40 and 41 Broome, N. Y.	32
Stanley Works, New Britain, Conn.	13
Hoe Ringers.	
Chambers, Bering & Quinlan, Decatur, Ill.	29
Holding Engines, Makers of.	
Crane Bros. Mfg. Co., Chicago, Ill.	6
Mundy J. S., Newark, N. J.	46
Holding Machines.	
Harrington Edwin & Son, Philadelphia, Pa.	47
Mason Volney W. & Co., Providence, R. I.	48
Hooks (Cotton & Rail).	
New York Handle & Naillet Works, 45 E. Houston	42
Horse Nails, Makers of.	
Assable Horse Nail Co., 4 Warren, N. Y.	41
Champion Steel Horse Nail Co., Appleton, Wis.	41
Globe Nail Co., Boston, Mass.	41
EP Horse Nail Co., Cleveland, O.	41
National Horse Nail Co., Vergennes, Vt.	41
Northwestern Horse Nail Co., Chicago, Ill.	41
Platt & Co., Buffalo, N. Y.	41
Pattman Nail Co., Neponset, Mass.	41
Stetson N. Jr., 72 Pearl, N. Y.	41
Horse Shoes, Makers of.	
Boston Rolling Mills, 17 Batterymarch, Boston	5
Burden Iron Works, Troy, N. Y.	5
Rhode Island Horse Shoe Co., Providence, R. I.	5
Schoenberger & Co., Pittsburgh, Pa.	4
Hydrants, &c.	
McLean John, 30 Monroe, N. Y.	47
Hydraulic Jacks.	
Dudgeon Richard, 24 Columbia, N. Y.	31
Ice Balances.	
Forchner Chas., 41 Livingston, N. Y.	31
Insurance, Boiler.	
Hartford Steam Boiler Inspection & Insurance Co.	47
Iron Brokers.	
Boynton Geo. A., 70 Wall, N. Y.	4
Edwards Edward J., Philadelphia, Pa.	4
Harty A. G., Pittsburgh, Pa.	4
Hazard T. D., 204 Pearl, N. Y.	4
Iron, Charcoal, Farm or Cold Blast.	
Quincy John W. & Son, William, N. Y.	4
Iron Commission Merchants.	
Adams Hugh W., 56 Pine, N. Y.	4
Low S. B., Chattanooga, Tenn.	4
Spooner & Collins, St. Louis, Mo.	4
Iron, Pig, Importers of.	
Williamson James & Co., 50 Wall, N. Y.	4
Iron, Manufacturers of.	
Abel Brothers, 100 South, N. Y.	4
Bonnett, Botsford & Co., Youngstown, O.	4
Borden & Lovell, 20 and 21 West, N. Y.	4
Carmichael W. J., 12 and 13 Cedar, N. Y.	4
Corney Daniel F., 88 Washington, N. Y.	4
Hueston J., 90 Market Slip, N. Y.	4
Fuller, Lord & Co., 59 Greenwich, N. Y.	4
Harrison & Gilson, 59 and 60 Water, N. Y.	4
Jackman & Chase, 25 and 26 Franklin, N. Y.	4
Judson B. F., 47 and 48 Water, N. Y.	4
Kane C., Pittsburgh, Pa.	4
Ogden & Wallace, 85, 87, 89 and 91 Elm, N. Y.	4
Pierce & Co., 34 Broadway, N. Y.	4
Pullmann J. Wesley, Philadelphia, Pa.	4
Quincy John W. & Son, William, N. Y.	4
Richards D. W. & Co., 32 Managin, N. Y.	4
Wallace Wm. H. & Co., Albany and Washington	4
Warner A. B. & Sons, 50 and 51 West, N. Y.	4
Williamson James & Co., 50 Wall, N. Y.	4
Whitney A. R. & Co., 58 Hudson, N. Y.	4
Iron, (Manufacturers Agents).	
Levis & Kimball, Philadelphia, Pa.	5
Iron, Manufacturers of.	
Boston Rolling Mills, 17 Batterymarch, Boston	5
Bradley, Reis & Co., 22 Cliff, N. Y.	5
Burden Iron Works, Troy, N. Y.	5
Collins H. E. & Co., Pittsburgh, Pa.	5
Houdette & Ellis, Boston, Mass.	5
Kirkpatrick, Beale & Co., Pittsburgh, Pa.	5
Leonard John, 45 and 47 West, N. Y.	5
Oxford Iron Co., 81 Washington, N. Y.	5
Phoenix Iron Co., 410 Walnut, Philadelphia	5
Roane Iron Co., Chattanooga, Tenn.	5
Rowland James & Co., 520 N. Delaware, Phila.	5
Rowland Wm. & Harvey, Philadelphia	5
Taylor & Bogds, Cleveland, O.	5
The Passaic Rolling Mill Co., Paterson, N. J.	5
Vulcan Iron and Nail Works, Chattanooga, Tenn.	5
U. S. Iron and Tin Plate Co., Pittsburgh, Pa.	5
Vulcan Iron and Foundry Co., Chattanooga, Tenn.	5
Zug & Co., Pittsburgh, Pa.	5
Iron, Planished Sheet, Manufacturers of.	
Wood W. D. Co., Pittsburgh, Pa.	4
Iron, Swedish, Importers of.	
Mittander Nils, 50 William, N. Y.	4
Ironware.	
Lalanc & Grosjean Mfg. Co., 50 Beekman, N. Y.	

ENTERPRISE MANUFACTURING COMPANY of PA.

Patented Hardware Manufacturers and Iron Founders.

Third and Dauphin Streets,

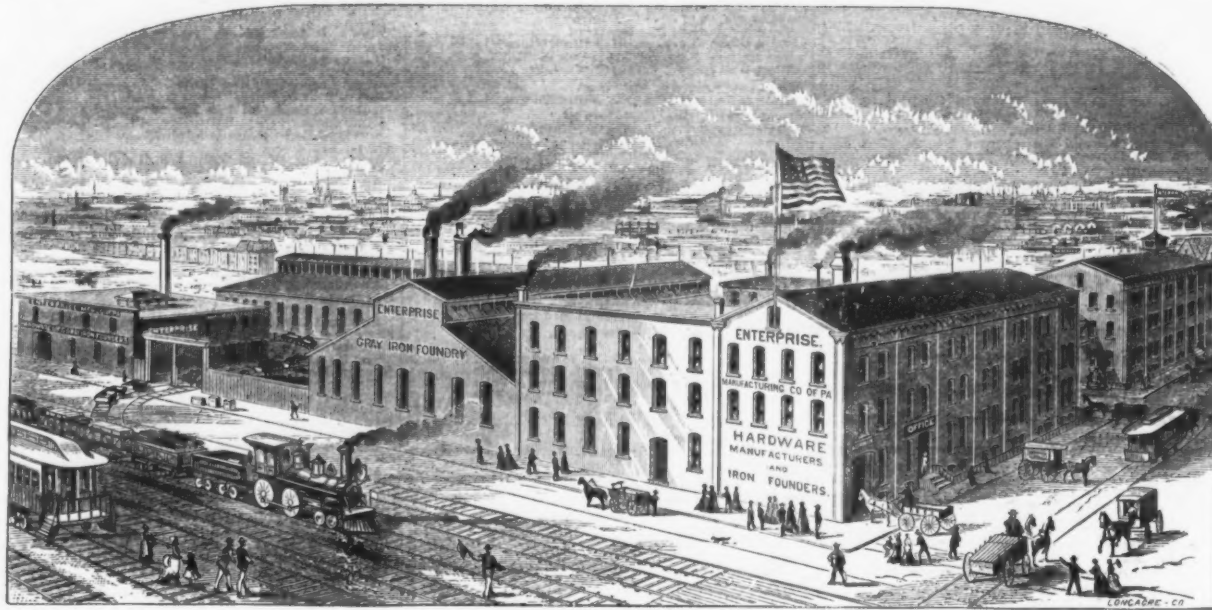
PHILADELPHIA.

SPECIALTIES:

Enterprise Patent Cold Handle
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and Girls'
IRONS.

Patent Measuring Faucets, Self-
Weighing Cheese Knife,
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&c., &c.

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VIEW OF WORKS.

SPECIALTIES:

American Coffee, Spice
and Drug Mills.

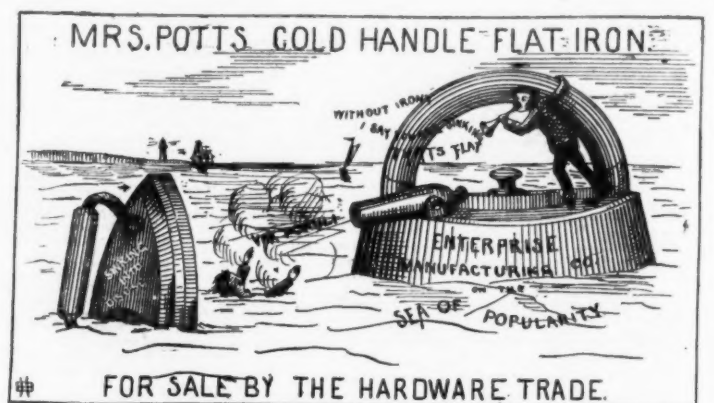
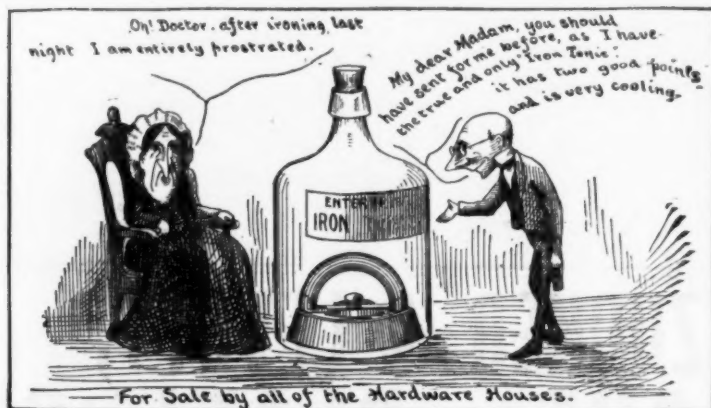
Combined Sausage Stuffer, Fruit
Lard and Jelly Press.

Champion Dried Beef Shaver.

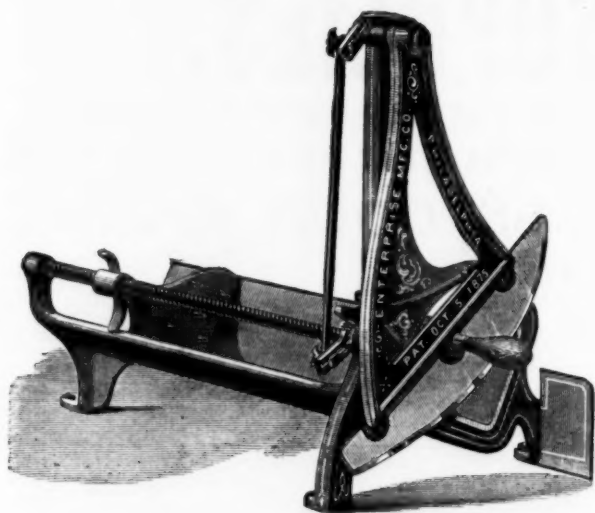
Bung Hole Borers.

Coffee Roasters, &c, &c.

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SHOWING A FULL SET OF IRONS.



Have you seen our
**New Champion Dried
Beef Shaver.**

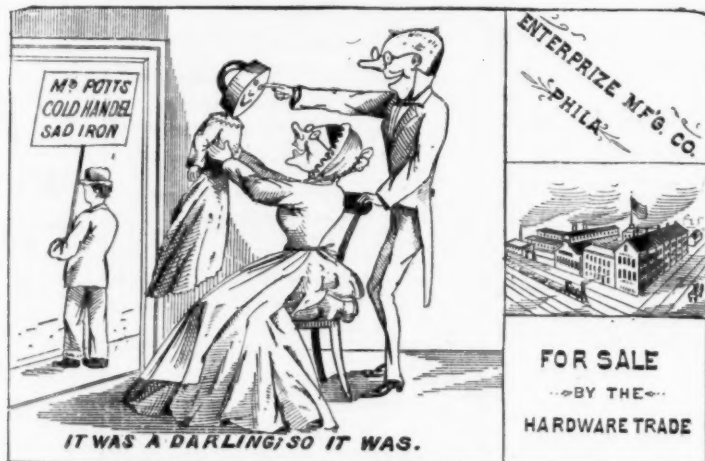
It is the Simplest.

It is the Cheapest.

It is the Best.

We guarantee it superior to all
others in the market.

PRICE, - \$6.00 each.



The season is near at hand
for using these machines.
We ask a comparison with
others in the market, both as
to price and quality.



Showing Mill Closed.



Showing Mill Open.

We make twenty sizes Coffee Mills, from \$2.00 to \$100.00

HENRY DISSTON & SONS

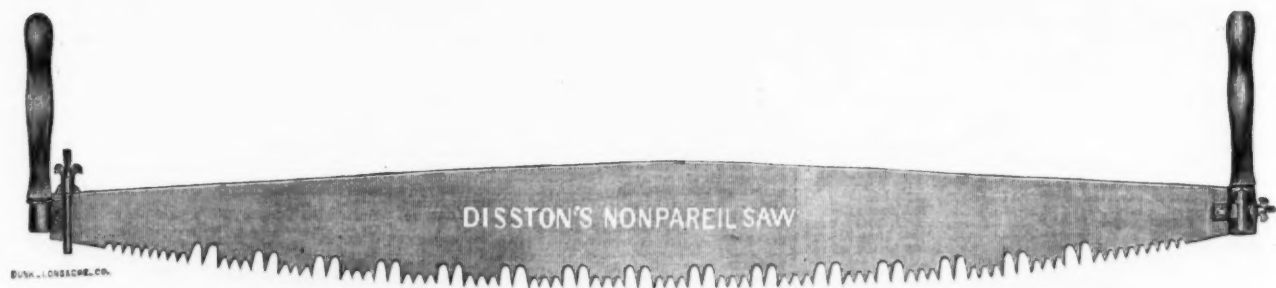
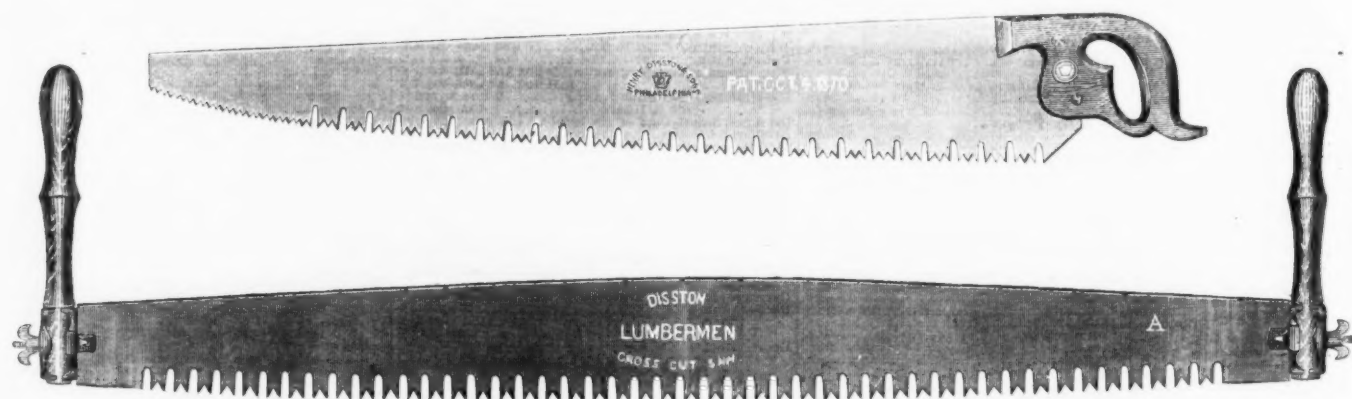
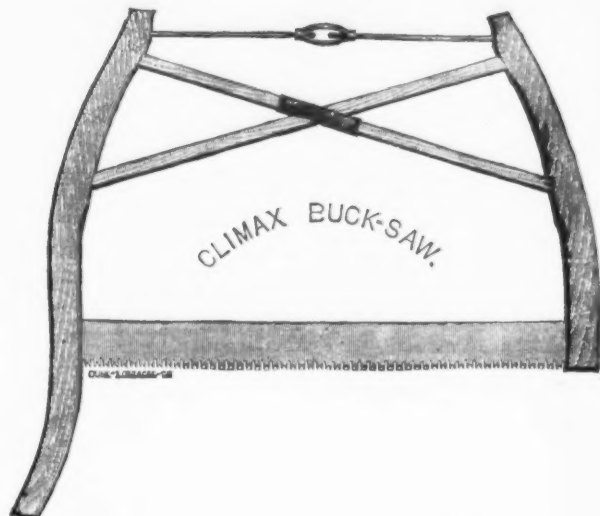
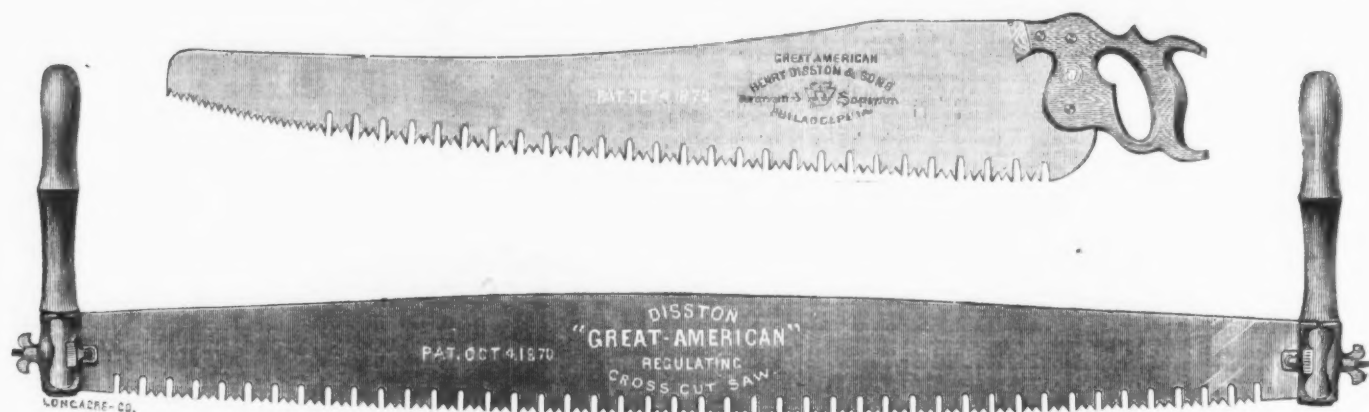
Keystone Saw, Tool, Steel & File Works.

FRONT AND LAUREL STREETS, PHILADELPHIA.

Branch Works, Tacony, Philadelphia.

Branch House, Randolph & Market Streets, Chicago. Ill.

OUR CELEBRATED CROSS-CUT AND WOOD SAWS.



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Sundries.

Asphaltum..... 75 gal. 150
Benzoline..... 75 gal. 150
Chalk..... 75 gal. 150
Dryer, Patent, Am'n..... 75 gal. 150
Epoxy..... 75 gal. 150
Olive, White..... 75 gal. 150
Sheet..... 75 gal. 150
Glass, Polish, Zinc..... 75 gal. 150
Gum, Copal..... 75 gal. 150
" Damar..... 75 gal. 150
" Shellac, English..... 75 gal. 150
" " " dark..... 75 gal. 150
Litharge, English..... 75 gal. 150
Pumice Stone, selected Lamp..... 75 gal. 150
Putty, in bladders..... 75 gal. 150
" in bulk..... 75 gal. 150
Rotten Stone, soft, English..... 75 gal. 150
Spirits Turpentine..... 75 gal. 150
Whiting Spanish..... 75 gal. 150

GLASS.

FRENCH WINDOW GLASS.

Prices current per box of 50 feet.

Single Thick.—discount 6 1/2

SIZES.	1st.	2d.	3d.	4th.
0 x 8 to 10 x 15.....	\$ 7.50	6.75	6.25	5.75
11 x 14 to 16 x 24.....	15.50	7.75	7.25	6.50
13 x 22 to 20 x 30.....	30.75	15.75	14.75	13.75
15 x 26 to 24 x 36.....	42.25	20.75	19.00	17.50
20 x 36 to 24 x 36.....	52.00	25.50	23.00	21.00
26 x 37 to 26 x 44.....	44.50	22.25	20.75	19.25
26 x 40 to 30 x 50.....	45.00	22.00	20.50	19.00
30 x 50 to 34 x 54.....	48.00	24.00	22.00	20.00
30 x 50 to 34 x 54.....	48.00	24.00	22.00	20.00
34 x 58 to 34 x 60.....	48.25	24.25	22.25	20.25
35 x 60 to 34 x 60.....	48.75	24.75	22.75	20.75

Double Thick.—Discount 6 1/2 to 8

SIZES.	1st.	2d.	3d.	4th.
0 x 8 to 10 x 15.....	\$12.00	\$11.00	\$10.00	\$ 9.00
11 x 14 to 16 x 24.....	15.75	12.50	11.75	10.50
13 x 22 to 20 x 30.....	19.75	15.75	14.00	12.50
15 x 26 to 24 x 36.....	25.00	19.50	17.50	16.00
20 x 36 to 24 x 36.....	31.00	24.00	21.75	20.00
26 x 37 to 26 x 44.....	23.25	21.25	19.75	18.25
26 x 40 to 30 x 50.....	24.00	22.50	20.00	18.50
30 x 50 to 34 x 54.....	25.75	23.50	21.75	20.00
30 x 50 to 34 x 54.....	25.75	23.50	21.75	20.00
34 x 58 to 34 x 60.....	26.75	24.50	22.50	20.75
35 x 60 to 34 x 60.....	27.25	25.00	23.00	21.25

Sizes above 34 x 60—\$10.00 per box extra for every five inches.

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 42 inches in length, and not making more than 8 united inches, will be charged in the 34 united inches size.

& CO.,

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POST HOLE AUGER.

Portable and the handiest Earth Auger in Market. Bore three holes while any other Auger is boring one. Works in clay, sand, gravel or muck soil, and will cut out the use of shovel or spade to start it. To the Trade, \$3.00 each. Less 20 per cent.



SPECIALTIES.

Horse Nails, National Horse Nails, Buffalo Garden Horse Shoes, Walker Horse Horse Shoes, Toe Calks, Cast Iron Nails and Vises, Horse Nails.

Special Choppers—"KING OF THE FOREST," "WOOD CHOPPER."

BRIDGE & CO.,

Buffalo, N. Y.

Open Ice Tongs,

MADE FROM

Refined Bar Iron,

Case Hardened,

JAPANNED,

\$2.00 per doz.



AMERICAN

CHISELS,

JAPANNED,

\$3.00 per doz.



PARD & CO.,

Manufacturers of

TAMPING WORKS.



MANUFACTURERS OF

TAMPED TIN WARE.

Ice Shovels, Spoons, Toilet Ware, Tin Pots, Iron Clad and Double Rim Cream Freezers, "Bankers," "Mining" Transportation Cans, Grocers', Druggists' and House Tinning Hardware.

& CO., Buffalo, N. Y.

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R. H. WOLFF & CO.,
IMPORTERS OF
IRON AND STEEL.

Sole Agents for the Sale of the Celebrated
Pr. HOMOGENEOUS DEC. CAST STEEL, GUN BARRELS, MOULDS AND ORDNANCE.
Sole Agents for **COCKER BROTHERS, Limited,**
Successors to **SAM'L. COCKER & SON, (ESTABLISHED 1752.)**
SHEFFIELD, ENGLAND.

Sole manufacturers of
"SC" EXTRA Cast Steel,
AND
CAST STEEL WIRE for all purposes.

Sole Makers of
Cocker's "Meteor" Wire Plates.
Railroad Supplies and General Merchants.
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F. W. MOSS,
Successor to **JOSHUA MOSS & GAMBLE BROS.**
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LOOK WELL TO YOUR HORSE'S FEET.



This drawing shows how many horses are made lame and permanently injured by the use of the cold-cut and sheared pointed nails. This process of manufacture produces lamination, causing the iron to form in layers, and when driven into the foot the horny fibres of which the hoof is composed cause the nail to separate at the point and one portion passes into the foot.

No. 4 represents one of these nails which was driven into the hoof, and sheared in driving, one thin blade passing into the quick or sensitive sole. No. 5 the thick blade of the nail passed out of the wall of the hoof for clinching. After a few days the horse was returned lame, and upon the removal of the shoe, a nail similar to the above was broken off, leaving the sliver in the foot; lockjaw ensued, from which the horse died. Upon dissecting the foot a portion of the nail was found to have penetrated through the coffin bone, as seen in Fig. 2, letter A, thus sacrificing the life of a valuable animal.

It requires but little observation and reflection, one would think, to arrive at the conclusion as to the kind of nails to be used in the horse's foot; whether a mangled piece of iron, rendered dangerous by the cold rolling and shearing process, or one made from the rod at a welding heat, where all the fibres remain intact, and a perfect oneness maintained, and which being pointed by the hammer, every grain is inspected, rendering such an accident as shearing utterly impossible.

The foot is the most important member of the animal's body, to which the greatest care and attention should be directed; for when it becomes injured or diseased, no matter how perfect or sound the other parts may be, the horse's services are diminished or altogether lost. Hence the value of a horse depends upon the condition of his feet. "NO FOOT NO HORSE."

As the remedy lies with the owner of the horse, it is for him to prohibit any cold-rolled or sheared nails being used in his horse's feet. The only Hot-Drawn and Hammer-Pointed Horse Shoe Nail in the World that is not cut or clipped, sheared upon the point, and will not split in driving, is the PUTNAM NAIL. See that your horse is shod with this nail and avoid all risks. For sale by all dealers in Horse nails.

The above drawing was made from a nail, showing the lamination of iron in the Cold-Rolled and Shearing process.

This drawing was made from the nail taken from the hoof and coffin bone, as shown in Figs. 1 and 2.

We have known several cases in which valuable horses have been badly lamed by the use of Cold-Rolled and Sheared horse shoe nails. We have used the same nails and been compelled to banish them from our shop. The Hot Forging process is the only sure manner of making a true driving and safe nail.

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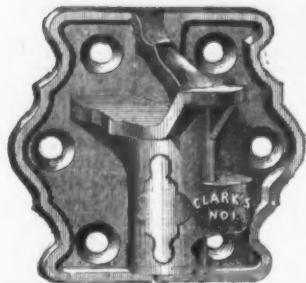
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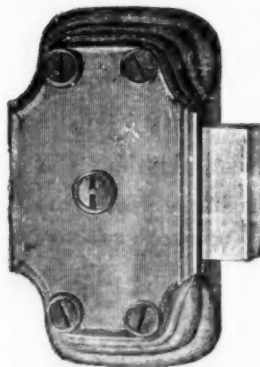


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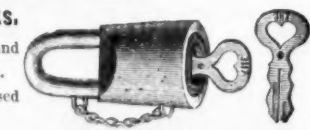


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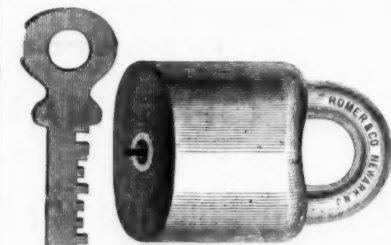
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As complete as can be found in any house. Also full stock of

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Full line of

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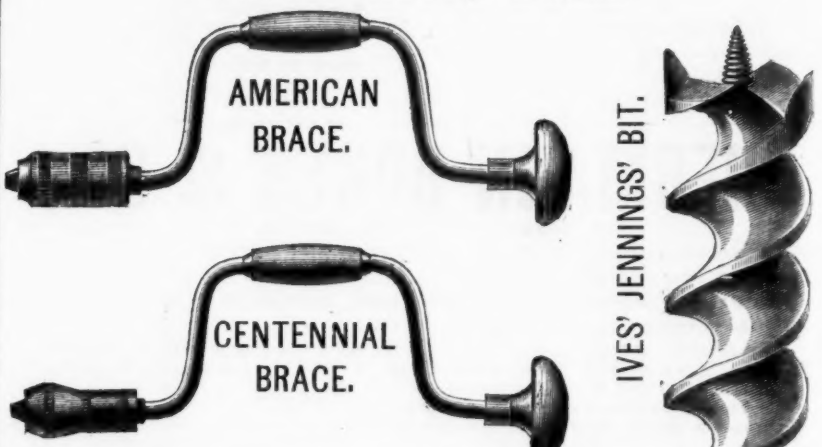
SHELF AND HEAVY HARDWARE.

Orders filled promptly from stock.

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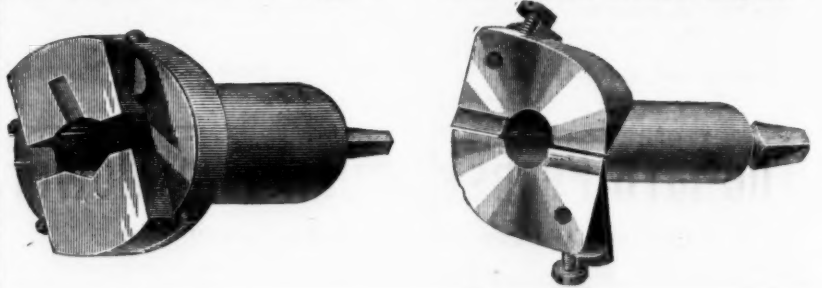
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Ives' Expansive Hollow Augers.

Ives, Novelty Hollow Augers.

**WM. H. HASKELL & CO.**

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COACH SCREWS

(With Gimlet Points),

ALL KINDS OF

Machine and Plow Bolts,

FORGED SET SCREWS,

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TAP BOLTS.



Britannia, Boardmans.....	dis 50c 10 1/2
Parkers.....	dis 50c 10 1/2
Tined.....	dis 15 @ 20 1/2
by case.....	dis 20 1/2
Prings.—Torrey.....	doz \$2 00 @ 2 10 net
Philadelphia.....	5 in. \$5 00; 8 in. \$7 00 per doz, dis 25 1/2

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Coach and Lag Screws.....	60&10	off net
Bolt Ends.....	60&10	off net

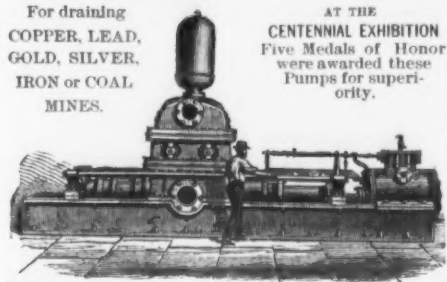
This tool is made on an entirely new principle, and is pronounced superior to any tool made for the purpose.

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Bucket Pumper. **VALLEY MACHINE CO.** Acme Steam Pump.
STEAM PUMP
 Manufacturers,
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Knowles' Patent Improved Mining Pumps.

For draining
COPPER, LEAD,
GOLD, SILVER,
IRON or COAL
MINES.



AT THE
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Five Medals of Honor
were awarded these
Pumps for superi-
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Arranged with Special Reference
to Working Water Contain-
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or Acid.

Pumps of capacity of over one million gal-
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through 600 feet vertical column, working
entirely without shock or jar, the entire
stoppages of Pump aggregating less than
twelve hours per year.

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Send for Illustrated and Descriptive Circular of the

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SAFETY STEAM BOILER.

The Boiler that made the Best, Dryest, Hottest and Greatest Quantity of Steam per
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the Highest Award therefor,

A DIPLOMA AND MEDAL.



AND HAS THE FOLLOWING SUPERIOR ADVANTAGES:

No cleaning of flues, no hard firing caused thereby, and no corrosion caused by the accumulation
of soot. Safety from disastrous explosion. The Utmost Durability. Economy, being the most eco-
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PORTABLE DRILLS. Driven by power in any direction.
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OFFICE AND WORKS:

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VALVES.

(Double and Single Gate, 1/2 in. to 48 in.—outside and inside Screws, Indicator, &c.
for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.

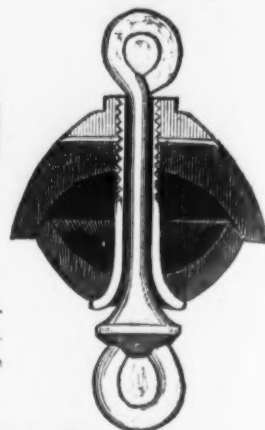
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SOLE OWNERS AND MANUFACTURERS OF

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RUBBER BUCKETS, PUMP CHAIN AND FIXTURES

For Chain Pumps.



These Patents cover the use of the Rubber, the use of the Nut and Bolt for
expanding, the use of the Tube and Valve for draining. All others are in-
fringements, and manufacturers and dealers in infringing Buckets will be
prosecuted to the full extent of the law.

For Rubber Buckets, Chain Tubing, Curbs and Fixtures, address

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THE GRAHAM ADJUSTABLE STOVE PIPE.

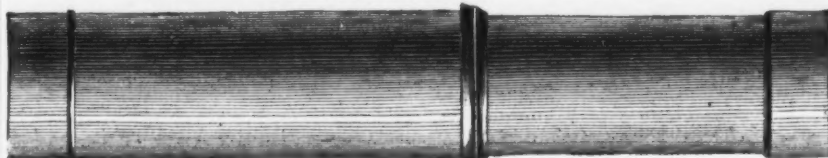
(Pat. Jan. 9, 1877.)

Medal Awarded at American Institute, 1877.

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Sole Manufacturers,

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THE EAGLE ANVIL!!

WARRANTED!!

(ESTABLISHED 1843.)



These Anvils are superior to the best English, or other Anvils, on account of
the peculiar process of their manufacture (invented and used only by this concern),
and from the quality of the materials employed.
The best English Anvils become hollowing on the face by continued hammering
in use, on account of the fibrous nature of the wrought iron—causing it to "settle"
under the face.

The body of the Eagle Anvil is of crystallized iron, and no settling can ever
occur; the steel face, therefore, remains perfectly true. Also, it has the great ad-
vantage that being of a more solid material, and consequently with less rebound,
the piece forged receives the full effect of the hammer, instead of a part of it being
wasted by the rebound, as of a wrought iron anvil. An equal amount of work can,
therefore, be done on this Anvil with a hammer one-fifth lighter than that required
when using a wrought iron anvil.

The working surface is in one piece of JESSEUP'S BEST TOOL CAST STEEL, which,
being accurately ground, is hardened and given the proper temper for the heavy-
est work. The horn is covered with and its extremity made entirely of steel.
The body of the Anvil is of the strongest grade of American iron, to which the ca-
steel face is warranted to be thoroughly welded and not to come off.

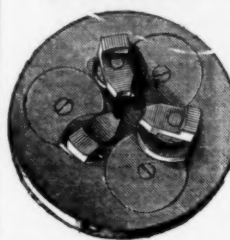
Price List, October 1st, 1876. ANVILS weighing 100 lbs. to 800 lbs., 2c. per lb.
Smaller Anvils, ("Minims.")

No. 0 1 2 3 4 5 6 7 8 9
Weighting about 5 lb. 10 lb. 15 lb. 20 lb. 30 lb. 40 lb. 50 lb. 60 lb. 70 lb. 80 lb. 90 lb.
\$2.25 \$2.75 \$3.25 \$4.00 \$4.50 \$5.25 \$6.00 \$6.50 \$7.25 \$8.00 \$8.50
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the purchaser's place of residence.

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trades.)

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JOHNSON'S PATENT UNIVERSAL LATHE CHUCK.



We invite attention
to the superior con-
struction of this chuck.
Its working parts are
absolutely protected
from dirt
and chips. It is
strong, compact and
durable, and will hold
the greatest variety of
work, as the jaws
are adjustable with a
range the full diam-

eter of the chuck. For Price List address:
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FINE TOOLS

for Machinists and Amateurs: Barnes' Foot Power
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Established in 1840.

Eureka Safety Power.
h.p. cyl. ht. space. wt. price.

2 3/4 4 1/2 10 40x25 000 \$150
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Also, Spark Arresting Portables
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ANVIL & VISE COMBINED.



No. 1, 10 1/2 x 4 in. face, 4 in. jaw Vise, weight 40 lbs., \$4.50
No. 2, 8 1/2 x 4 in. face, 3 1/2 in. " " 25 " 3.75
No. 3, 6 1/2 x 4 in. " " 18 " 3.00
The face of the Anvil is chill hardened. Terms cash.
Delivered on cars at Worcester.

RICHARDSON MFG. CO., Worcester, Mass.

Liberal discount to the trade.

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AND

Eddy Valves.

All Styles and Sizes.

Made (and patents owned) by

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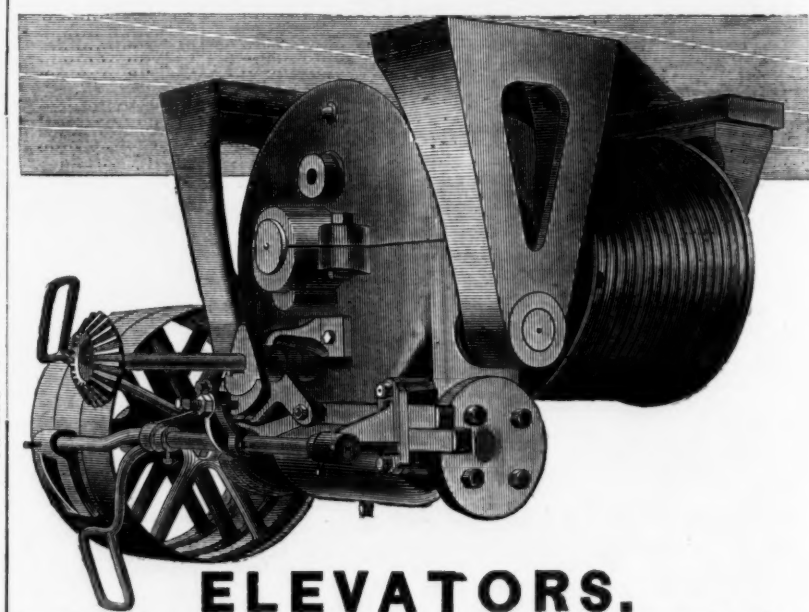
Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



Manufacture of Patent Machine Relieved Nut, Hand, Black-
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either in V or U. S. Standard shape of threads.

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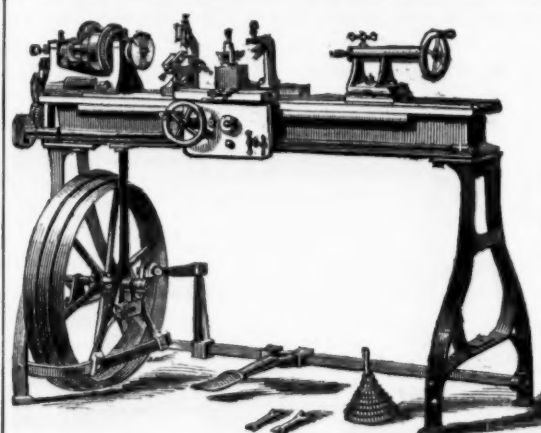
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INDEPENDENT STEAM ELEVATOR ENGINE.

Hydraulic Elevators to run from City Pressure; Condensed Air and Hydraulic Elevators operated
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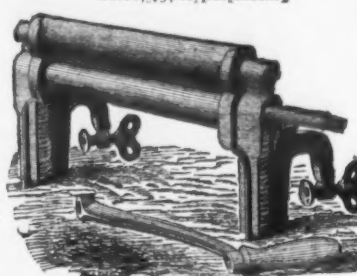
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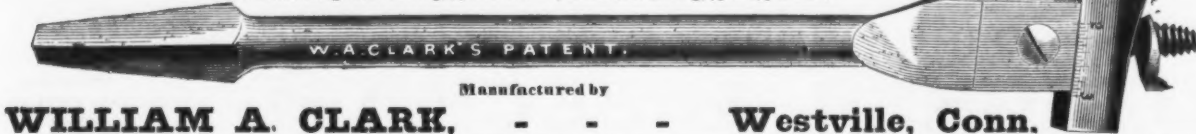
No. 10, Family Size, with
Cog Wheels.
Price, \$60.00 per dozen.



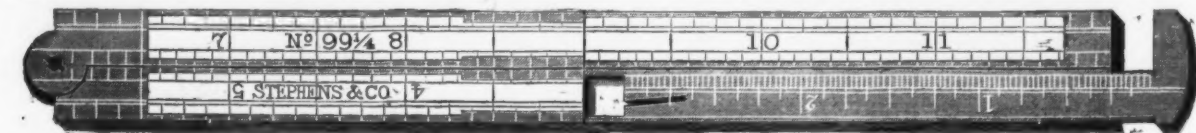
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Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other
Two sizes: Large Size Boring, 1/4 to 3 inches; Small Size Boring, 1/8 to 1 1/4 inches.



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Rules graduated in foreign measure to order.
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Rubber Rolls, Thumbscrews,
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Rivalling the English and all Others.

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37, 39 1/2 x 36 1/2 x 37 1/2; 38, 40 1/2 x 37 1/2 x 38 1/2; 39, 41 1/2 x 38 1/2 x 39 1/2; 40, 42 1/2 x 39 1/2 x 40 1/2; 41, 43 1/2 x 40 1/2 x 41 1/2; 42, 44 1/2 x 41 1/2 x 42 1/2; 43, 45 1/2 x 42 1/2 x 43 1/2; 44, 46 1/2 x 43 1/2 x 44 1/2; 45, 47 1/2 x 44 1/2 x 45 1/2; 46, 48 1/2 x 45 1/2 x 46 1/2; 47, 49 1/2 x 46 1/2 x 47 1/2; 48, 50 1/2 x 47 1/2 x 48 1/2; 49, 51 1/2 x 48 1/2 x 49 1/2; 50, 52 1/2 x 49 1/2 x 50 1/2; 51, 53 1/2 x 50 1/2 x 51 1/2; 52, 54 1/2 x 51 1/2 x 52 1/2; 53, 55 1/2 x 52 1/2 x 53 1/2; 54, 56 1/2 x 53 1/2 x 54 1/2; 55, 57 1/2 x 54 1/2 x 55 1/2; 56, 58 1/2 x 55 1/2 x 56 1/2; 57, 59 1/2 x 56 1/2 x 57 1/2; 58, 60 1/2 x 57 1/2 x 58 1/2; 59, 61 1/2 x 58 1/2 x 59 1/2; 60, 62 1/2 x 59 1/2 x 60 1/2; 61, 63 1/2 x 60 1/2 x 61 1/2; 62, 64 1/2 x 61 1/2 x 62 1/2; 63, 65 1/2 x 62 1/2 x 63 1/2; 64, 66 1/2 x 63 1/2 x 64 1/2; 65, 67 1/2 x 64 1/2 x 65 1/2; 66, 68 1/2 x 65 1/2 x 66 1/2; 67, 69 1/2 x 66 1/2 x 67 1/2; 68, 70 1/2 x 67 1/2 x 68 1/2; 69, 71 1/2 x 68 1/2 x 69 1/2; 70, 72 1/2 x 69 1/2 x 70 1/2; 71, 73 1/2 x 70 1/2 x 71 1/2; 72, 74 1/2 x 71 1/2 x 72 1/2; 73, 75 1/2 x 72 1/2 x 73 1/2; 74, 76 1/2 x 73 1/2 x 74 1/2; 75, 77 1/2 x 74 1/2 x 75 1/2; 76, 78 1/2 x 75 1/2 x 76 1/2; 77, 79 1/2 x 76 1/2 x 77 1/2; 78, 80 1/2 x 77 1/2 x 78 1/2; 79, 81 1/2 x 78 1/2 x 79 1/2; 80, 82 1/2 x 79 1/2 x 80 1/2; 81, 83 1/2 x 80 1/2 x 81 1/2; 82, 84 1/2 x 81 1/2 x 82 1/2; 83, 85 1/2 x 82 1/2 x 83 1/2; 84, 86 1/2 x 83 1/2 x 84 1/2; 85, 87 1/2 x 84 1/2 x 85 1/2; 86, 88 1/2 x 85 1/2 x 86 1/2; 87, 89 1/2 x 86 1/2 x 87 1/2; 88, 90 1/2 x 87 1/2 x 88 1/2; 89, 91 1/2 x 88 1/2 x 89 1/2; 90, 92 1/2 x 89 1/2 x 90 1/2; 91, 93 1/2 x 90 1/2 x 91 1/2; 92, 94 1/2 x 91 1/2 x 92 1/2; 93, 95 1/2 x 92 1/2 x 93 1/2; 94, 96 1/2 x 93 1/2 x 94 1/2; 95, 97 1/2 x 94 1/2 x 95 1/2; 96, 98 1/2 x 95 1/2 x 96 1/2; 97, 99 1/2 x 96 1/2 x 97 1/2; 98, 100 1/2 x 97 1/2 x 98 1/2; 99, 101 1/2 x 98 1/2 x 99 1/2; 100, 102 1/2 x 99 1/2 x 100 1/2; 101, 103 1/2 x 100 1/2 x 101 1/2; 102, 104 1/2 x 101 1/2 x 102 1/2; 103, 105 1/2 x 102 1/2 x 103 1/2; 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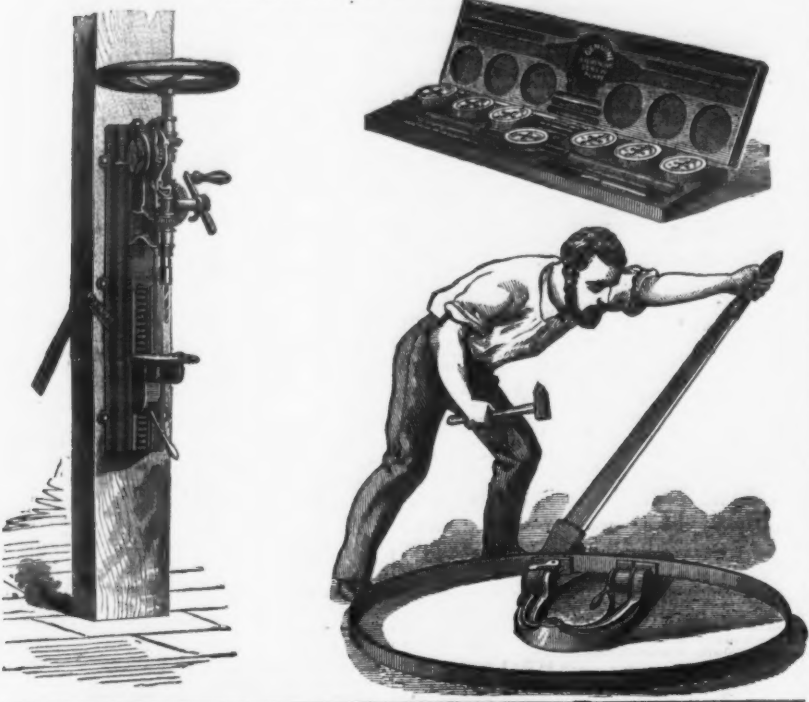
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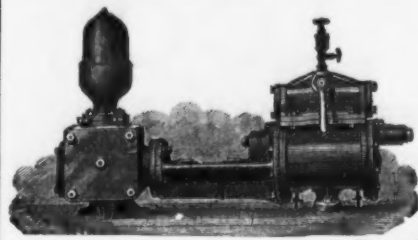
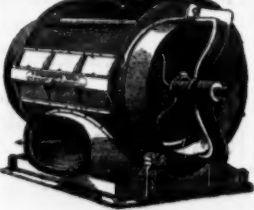
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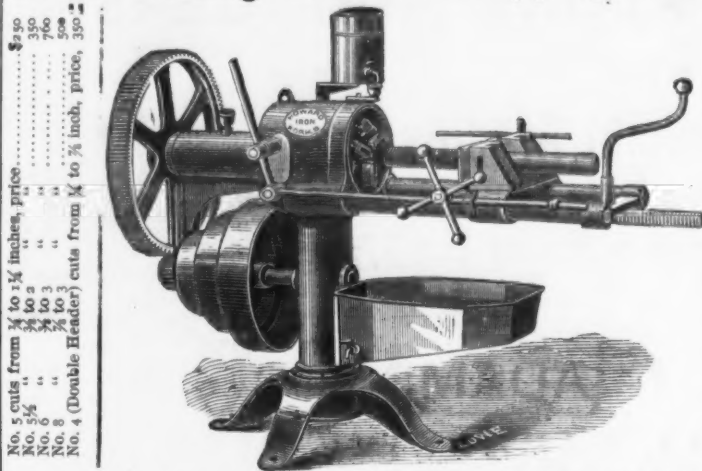
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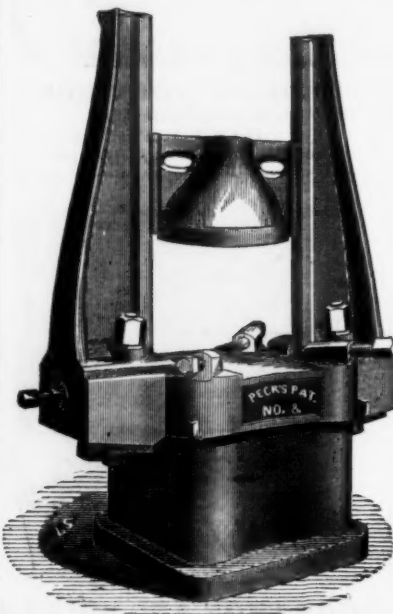
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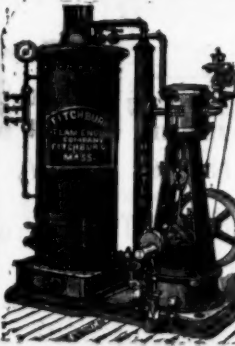
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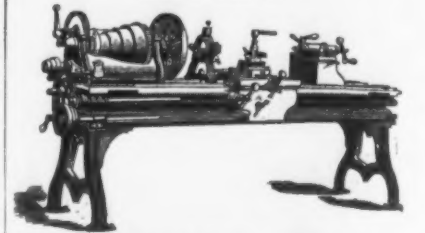
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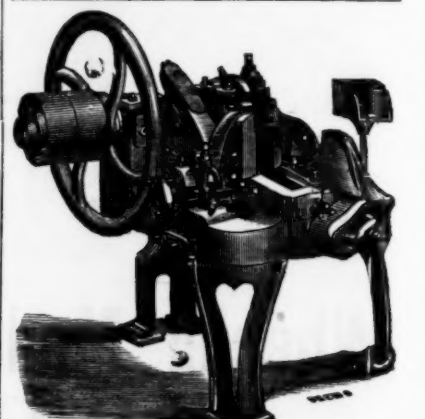
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FEBRUARY 1, 1877.

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3/4	18.00	20.00	1.00
1	20.00	22.00	1.00
1 1/4	23.00	25.00	2.00
1 1/2	26.00	28.00	2.50
1 3/4	31.00	33.00	2.75	10.00
2	36.00	41.00	3.25	12.00
2 1/4	40.00	45.00	3.50	14.00
2 1/2	45.00	51.00	3.75	16.00
3	50.00	57.00	4.25	19.00
3 1/4	59.00	67.00	4.50	23.00
3 1/2	69.00	78.00	5.00	28.00
4	80.00	90.00	5.50	34.00
4 1/2	90.00	101.00	6.00	40.00
5	105.00	117.00	6.50	46.00
5 1/2	120.00	133.00	7.00	54.00
6	140.00	155.00	8.00	65.00
6 1/2	175.00	192.00	9.00	79.00
7	210.00	218.00	10.00
8	210.00	218.00	12.00

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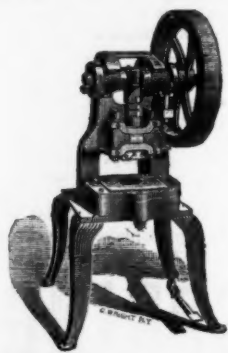
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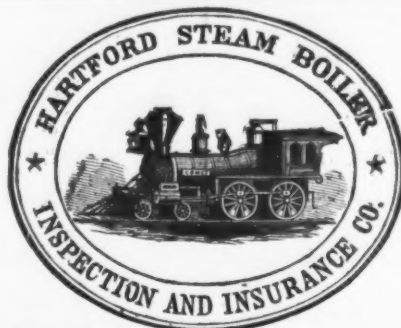
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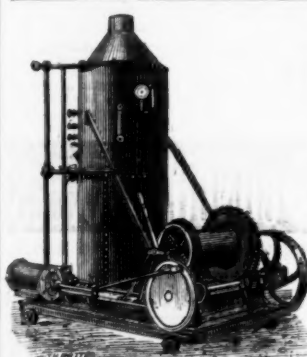
Full information concerning the plan of the Company's operations can be obtained at the
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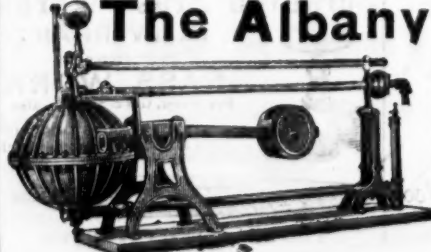
These elevators have advantages over special steam service, in first cost of construction, running expense, convenience, cleanliness and saving of insurance.

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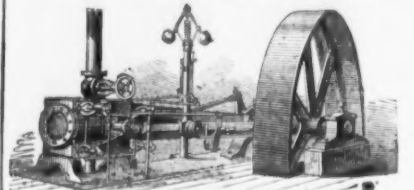
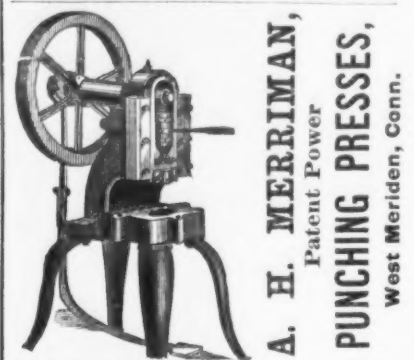
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This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

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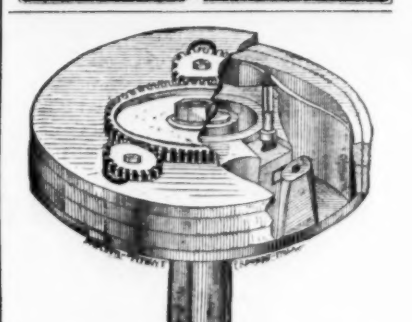
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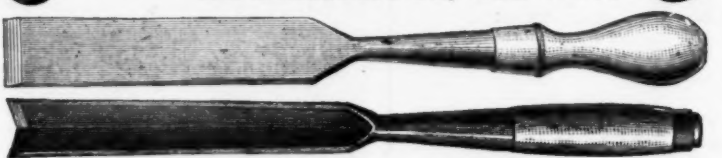
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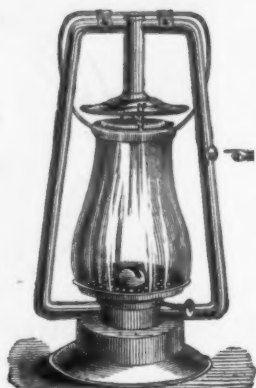
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NEW IMPROVEMENTS

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Manufacturers of Patent

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FRICION CLUTCHES

For connecting Shafting and Gearing.

Hoisting Machinery & Elevators, Shafting, Hangers and Gearing.

Lafayette Street, PROVIDENCE, R. I.

See cut of Elevator Hoisting Machine in issue of May 16, 1878, page 35.

PATTERNS, MODELS

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TRIAL OF THE IMPROVED LIGHTNING SAW.

The Emperor, Dom Pedro, accompanied by Director General Goshorn, Superintendent Albert, and others, visited Machinery Hall, at the Centennial on the evening of June 28th. Among other things inspected, at the invitation of E. M. BOYNTON, of New York, they witnessed a trial of the New Lightning Saw, patented March 26, 1876. Two men, with one of these saws, cut off a sound log of gum-wood, one foot extreme diameter, in seven seconds, or at the rate of a cord of wood in five minutes. Messrs. Corliss, Morell, Lynch, and other members of the commission, witnessed the trial and timed the cutting. The Emperor remarked, That was fast, very fast cutting. Last evening the Emperor made another examination of the saw.—Philadelphia Press, June 30.

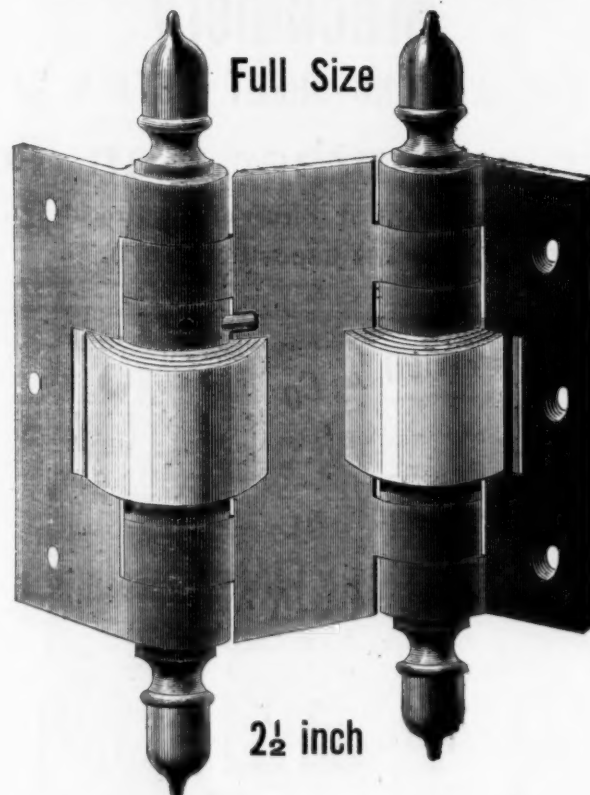
"BOYNTON'S SAWS were effectually tested before the judges at the Philadelphia Fair, July 6th and 7th. An ash log, eleven inches in diameter, was sawed off, with a four-and-a-half-foot lightning cross-cut, by two men, in precisely six seconds as timed by the chairman of the Centennial Judges of Class Fifteen. The speed is unprecedented, and would cut a cord of wood in four minutes. The representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries, were present, and expressed their high appreciation."

Received Medal and Highest Award of Centennial World's Fair, 1876. \$1000 Challenge was prominently displayed for six months, and the numerous saw manufacturers of the world dared not accept it, or test in a competition so hopeless.

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